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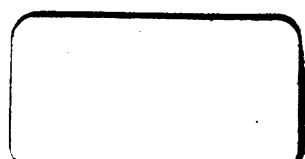
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**JOURNAL**  
**OF THE ASSOCIATION OF**  
**MILITARY**  
**SURGEONS**  
**OF THE UNITED STATES.**

**EDITED BY**

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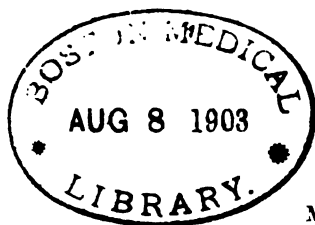
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**VOLUME XII.**

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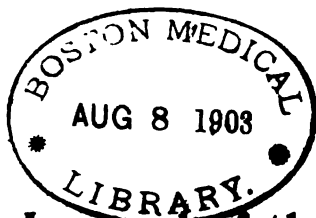


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**THE MEDICAL DEPARTMENT OF THE UNITED  
STATES ARMY TRANSPORT SERVICE.**

**By MAJOR HENRY SAYLES KILBOURNE.**

**SURGEON IN THE UNITED STATES ARMY; LATELY MEDICAL SUPER-  
INTENDENT UNITED STATES ARMY TRANSPORT SERVICE.**

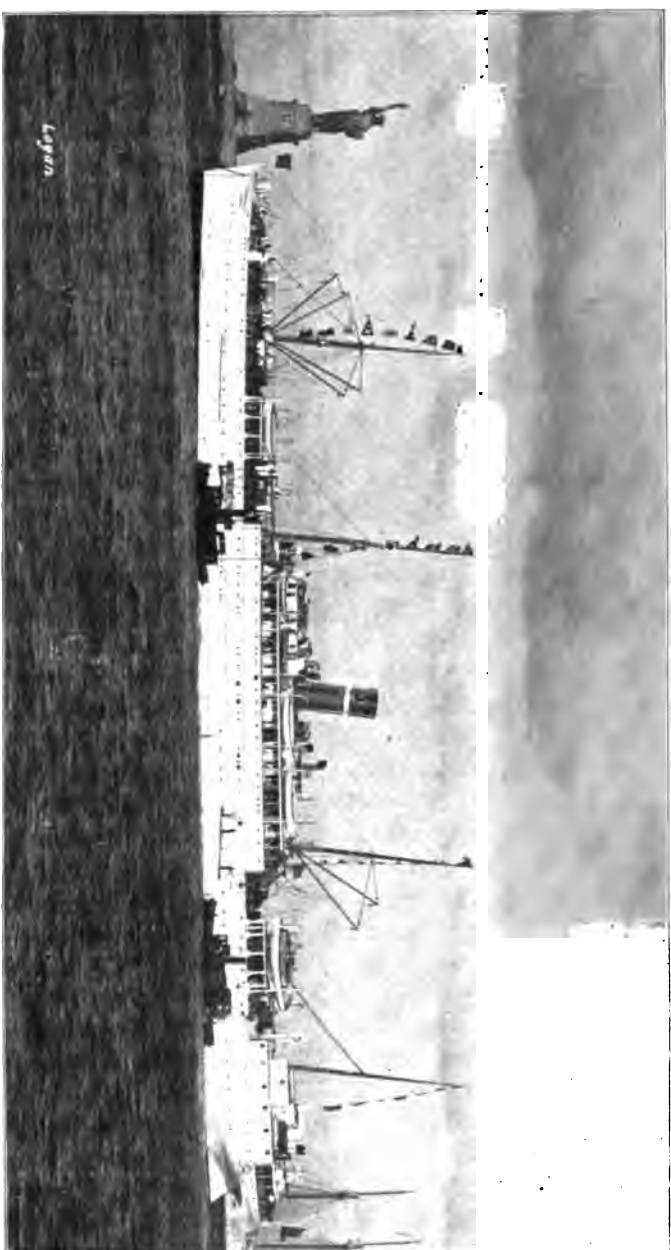
**T**HE Army Transport Service is an outgrowth of the war with Spain. Prior to that event troop ships were not owned or operated by the United States. The requirements of the Army for ocean transportation in former wars have been met by the employment of chartered vessels adapted for the occasion by such hasty refitting as the nature of the available shipping and the time for preparation allowed—the result being a series of makeshifts more or less defective.

For the Cuban campaign coastwise steamers, chiefly of lines engaged in the West India and Gulf trade, were hastily chartered and dispatched to Tampa, their freight decks fitted with crowded tiers of wooden bunks and little else for the accommodation of the troops. Some vessels of this improvised fleet had state rooms and other conveniences and luxuries for cabin passengers available for officers, with but small space below suitable for enlisted men with their equipage and supplies. Others were deficient in cabin room but with large freight space unsuitable for passengers of any sort. All were more or less wanting in adequate equipment for the proper transportation of troops during a protracted sea voyage. The lower decks, designed for freight carrying,

lacked ventilation, lighting, latrines and fixtures for washing, bathing, messing, etc., necessary for maintaining the health and morale of troops at sea. In the hot and humid air of the tropic these deficiencies quickly became intolerable. Overcrowding added to the difficulties of the situation and a voyage prolonged to three or four times the normal period of making the passage further complicated the conditions of the movement. The hardships of this protracted voyage could not have been a good preparation for the necessary fatigues of the impending campaign, although, such was the enthusiasm, without immediate effect on the spirit of the soldiers. They lived as much as possible on the upper decks, the fine weather permitting this, and went below into the stifling heat and moisture only when compelled by necessity.

These experiences, with some variations, were repeated on the reembarkation of the 5th Army Corps after the surrender of the city of Santiago de Cuba. The condition of the victorious troops on landing at Montauk, at the close of the campaign, is too well known to need comment. The necessity for improved methods of over sea transport for troops and war material had, among other things, become obvious. In the meantime similar difficulties had been encountered in the movement of the first expedition to the Philippines. On the Pacific coast, as on the Atlantic seaboard, it became evident that suitable vessels for the transport of an increasing army rendered necessary by the insurrection of the Filipinos, could hardly be obtained. The occupation of Cuba and Porto Rico also demanded a continuous ocean service which commercial lines were unable to furnish in a satisfactory manner.

To meet these emergencies on both coasts the War Department organized the Army Transport Service as a separate branch of the Quartermaster's Department. A board of officers, the senior being the late Gen. Ludlow, devised the scheme and formulated the regulations for operating the enlarged service. Marine experts gave aid to the Army. Steamships of suitable design and tonnage were found on both coasts, surveyed, purchased, and refitted on plans drawn to meet the requirements of troops in transit over sea, as well as for the shorter coastwise



The United States Army Transport, "Logan."

voyage to the Spanish Main. The organization provided for two divisions of the ocean service, one with headquarters in New York City, the other in San Francisco, having similar officers and employees at both stations. An officer of the Quartermaster's Department had direction and control as Superintendent, assisted by a Commissary and a Medical Officer. To each transport was assigned a quartermaster, with general charge of the ship and a transport surgeon from the Army. The ship's officers and crew were drawn from the Merchant Marine, excepting a



**Berth Deck of the United States Army Transport, "Sumner."**

detail from the Army Hospital Corps. The transport quartermaster performed the duties of a commissary in the absence of an officer of that Department. Members of the Hospital Corps and Commissary Sergeants were detailed to duty on board as their services might be required.

The plans for refitting vessels for troop ships provided for berthing on one or two decks below the main deck, according to the size and plan of the ship, with an allowance of from 80



to 100 cu. ft. of air space per man. Steel berth sections in 3 tiers had canvas bed bottoms lashed to the side frames, removable for washing. All berth deck and dead air spaces below had air ducts leading to incast and outcast ventilator fans on the upper decks; the state rooms, saloon, and hospital having also electric fans. The whole ship was lighted by incandescent lamps from dynamos on the main deck. The main deck, excepting engine space and crew's quarters forward, was occupied by mess rooms, cook's galleys, dining saloon, bakery, etc.



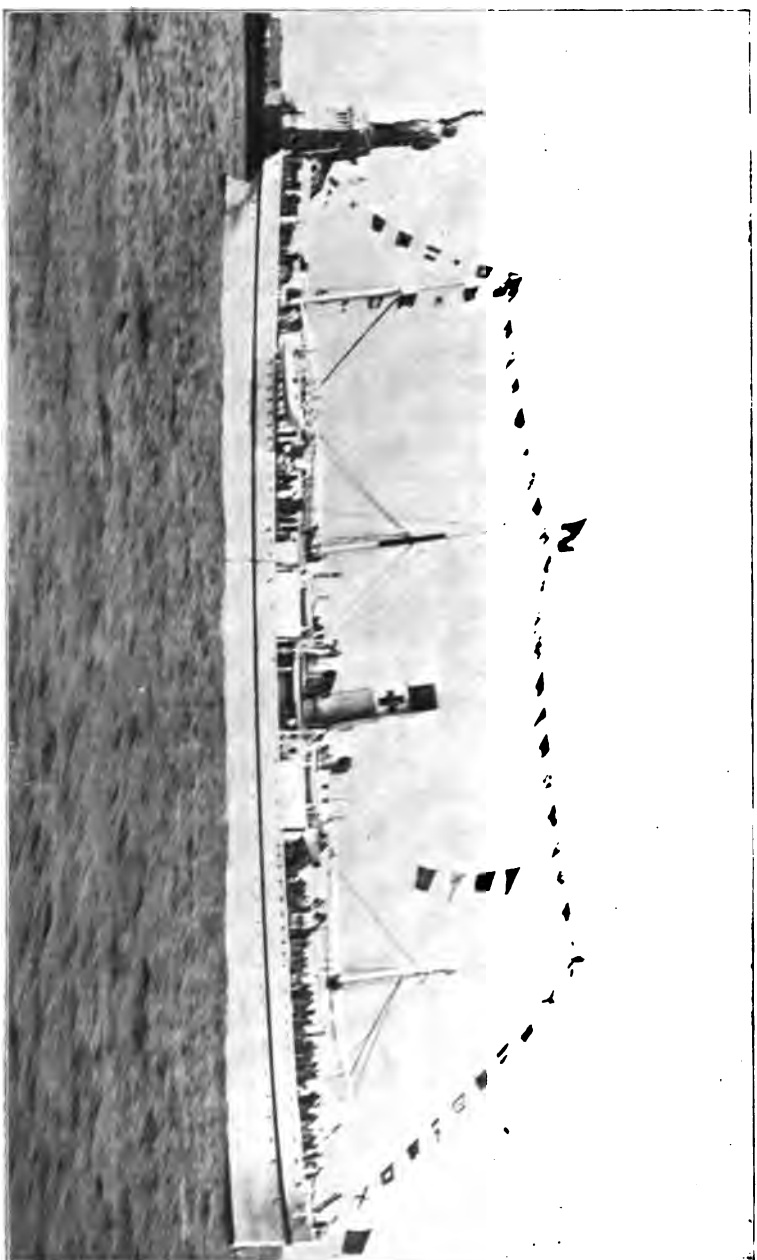
**Main Ward of the Hospital on the United States Army Transport, "Meade."**

On the larger transports the ship's hospital occupied the after part of the main deck and afforded accommodation for from 3 to 5% of their troop capacity. The air space per man averaged from 100 to 150 cu. ft. in the main ward. Above the latter an isolation ward with a separate room for intractable patients gave accommodation for from 6 to 12 sick. Separate lavatories, baths, and closets for this ward secured isolation of infectious cases. A lavatory, closets, a dispensary, operating room, linen room, special diet kitchen, surgeon's office, and rooms for attendants,

all with requisite fixtures and furniture adjoined the main ward. Lockers for clothing were placed along the ship's sides. A general store room for medical supplies on the deck below had access through the floor of the main ward. Air ducts overhead having lateral discharge into the ward supplied adequate ventilation when port lights were closed in heavy weather. Double tier steel berth sections with woven wire bed bottoms (later exchanged for canvas) were secured to the deck. Surgical instruments and apparatus and medical supplies for three months for all on board completed the medical equipment.

On the troop decks and spar deck special attention was given to the installation of lavatories, shower baths, water closets, urinals, and laundry tubs, as well as an accessible supply of drinking water for the troops. The water supply came from two sources, the ships tanks and a distilling apparatus of sufficient capacity to supply potable water for all on board in case of failure or impurities of the water shipped in tanks at ports of call. A refrigerating plant with an ice machine attachment provided cold storage for all perishable food stuffs and produced ice for the hospital and saloon mess. In hot latitudes the drinking water was cooled by refrigerating coils. A steam laundry set up on one transport not proving satisfactory in operation was substituted by fixed tubs on the others, to which the men had access in relays. Excepting in a rough sea, when the majority succumbed to sea sickness, these various accessories ensured clean, dry, well aired and light dormitories. In tropical seas the men sought to be as much as possible on deck.

On the main deck forward of the engines all space excepting crew's quarters could be cleared by folding and stowing the mess tables and benches, thus providing room for exercise and recreation in heavy weather. Besides the articles composing the army ration issued to troops and crew the transport commissary supplied special foods for the sick in hospital as well as additional articles for the saloon mess. Regular inspections by the ship's officers and the commanding officer of troops in accordance with transport regulations was gradually evolved as officers and employees became familiar with their duties. Various modifications of the original plans were adopted to conform to the size and



The United States Army Hospital Ship, "Missouri,"

model of the ship and the nature of their service. On the West India route hammocks proved more practicable for the troop decks than the berth fixtures installed on the over sea troop ships, thus making these decks available for freight carrying as occasion demanded. The hospital accessories needed on this route were less extensive than those on the larger vessels on the longer voyage to the Philippines. Of the fleet refitted at various Atlantic ports the greater number carried troops from New York City to Manila, via the Suez Canal, sailing thence to San Francisco, and thereafter being transferred to the Pacific division of the Service, as the field of military operations shifted from Cuba to the Philippines.

On account of the liberal provision for the sick and wounded made on the transports and the greater frequency of their voyages to and from Manila it appeared practicable to dispense with the service of two of the hospital ships employed during the Spanish war and later dispatched to the Philippines. These, although having a record of good service on the Atlantic Coast during the war with Spain, proved to be not well adapted for the longer voyages of the Manila service. The "Relief," a model hospital ship for coastwise service, was for a time, retained at Manila as a floating hospital after a single voyage to San Francisco from the former port to which she had been dispatched by the Eastern route, and after voyages from Manila to China and Japan, during military operations in the former country. The hospital ships on their acceptance by the Army Medical Department passed from the Transport Service to the direct control of the Surgeon General of the Army. Of the three vessels specially fitted for service as hospital ships all have since been surrendered to the Quartermaster's Department for other service.

Since the return of the Volunteer troops from the Philippines all chartered transports have been released from service. Of these a small number served as animal transports, the practice being to move men and horses separately. Upward of twelve troop and freight transports now continue in service the greater number sailing between San Francisco and Manila, a voyage of about 30 days each way. The service has been continually improved since its inception and is at this time operating to the satisfaction of

the supply departments of the army in their labor of maintaining the efficiency of the Army of occupation in the Philippines. The problem of moving large bodies of troops over sea and delivering them in good condition for campaigning in the tropics appears to have been fairly solved by the methods and appliances of the Army Transport Service. The problem of moving them across the continent without loss or injury, by adoption of the methods of railway tourist service has also been successfully dealt with. The further problem of moving large numbers of troop, battery, and draught animals on protracted voyages remains for future development.

The Transport Service is operated under a special code of regulations defining the duties of its officers and employees; the authority of officers in command of troops in transit, prescribing the daily routine at sea and methods of embarking and disembarking troops their equipage and supplies. These regulations have been amended as experience demanded with reduction of friction and manifest improvement of the service. Details of plan of the earlier vessels became modified in the later ones as the needs of the troops and the working of the apparatus installed on board required. With naval practice as a model it soon became obvious that soldiers, and especially unseasoned troops, require different treatment from sailors. Unaccustomed to the sea and to the confinement and monotony of shipboard soldiers quickly fall out of condition for service unless special care be taken to maintain their efficiency. A constant tendency toward overcrowding the ships, general seasickness, and the prevalence of infectious diseases, to which recruits and new troops are everywhere subject, rendered effective sanitation difficult. These disorders, inseparable in some degree from all military operations by sea, had been foreseen and consequently mitigated. The indifference of mariners generally, to matters of sanitation not hallowed by the practice and traditions of seafaring had to be met, overcome, or compromised, in order to maintain a military hygiene on board adapted to marine conditions. The greater obstacles arose from the necessary economy of space on shipboard.

Among improvements in sanitation effected, the following are the more notable: The prevalent dampness of lower decks was

diminished by the incast and extraction fans installed on all over-sea troop ships. A free circulation of air below appears to be a prime necessity for vessels sailing in tropical waters where combined heat and humidity are inimical to passengers and destructive to cargo. Apparatus for cooling or warming the air distributed added further to the health and comfort of the troops. The use of folding mess room furniture (tables and benches) permitted the clearing of deck space for exercise and recreation of the troops during heavy weather when they would otherwise be restricted to the berth decks. The refrigerating apparatus besides supplying cooled air improved the dietary of the ration by affording cold storage preservation of perishable foods, as well as ice for the sick. The segregation of the sick with adequate hospital appliances facilitated their proper care and the protection of passengers and crew. The installation of lavatories, baths, latrines, and laundry, on the troop decks prevented disease and preserved the morale of the troops. An ample supply of pure water was secured by the double system of storage and distillation. These, with separate galleys for soldier's mess where a full ration could be prepared and served, and strict cleanliness on the berth decks met the principal requirements of effective sanitation.

Quarters for the ship's company were refitted on similar lines but with yet greater economy of space. Ample deck room for soldiers is had only at the expense of carrying capacity. In berth decks with 9 ft. between deck floors an allowance of  $6\frac{1}{2} \times 4$  ft. deck space for 3 tier double berth sections, including gangways 3 ft. wide, yields  $6\frac{1}{2} \times 4 \times 9 = 234$  cu. ft. air space, or 78 cu. ft. per man, fixtures, furniture, etc. included. This is clearly insufficient on theoretical grounds for proper ventilation; practically it is deemed a liberal allowance for transportation by sea and is increased only by outfall of the ship's sides and large hatches in some compartments of a troop ship. The evils of such close stowage are mitigated by fan ventilation, electric lighting and cleanliness of the person, bedding, and deck floors. Vacating the upper berth affords a ready remedy but seldom available. Hammocks as used in the Navy swung in two tiers offer more air space when in use and more free deck space when stowed. Soldiers prefer the "standees."

The number of fixtures on troop decks in lavatories, bath rooms, water closets and urinals varies with troop capacity. A wash basin for each 10, a closet for 20, a shower bath and urinal for 30 men are sufficient for disciplined troops, but should be had in larger proportion for untrained men.

It is obvious that the berth decks are not suitable for squad rooms. In daytime the men must live on the upper decks. These on all transports are much encumbered with machinery, life boats, and other marine apparatus, yet the larger ships usually afford space for the men to move about in when occupied by companies, or battalions in turn. The mess service on a full ship is necessarily by relays when a seat and place at table is ordered, or allowed. From one-third to one-half of the men can be served at the same time without delay.

The equipment of a transport hospital is similar in personnel and materiel to that of a post hospital with allowance for the limitations of a ship. The medical service, medical supplies, records, reports, etc., are maintained on army methods. Provision is made for aseptic surgery, special diets, and isolation of infectious diseases. On the larger ships, of the "Thomas" and "Logan" class, carrying a maximum regiment there is hospital accommodation for about 70 sick. This has proved adequate excepting when measles has prevailed among unseasoned troops on board. For the greater requirements of raw troops it was found necessary to add largely for waste and loss of supplies in their outfitting. Quarters for female nurses were omitted as inexpedient in the plan of the transport hospitals. Carried as passengers their services have frequently been utilized and proved valuable as in the general hospitals on shore. Further details of the service of transports are omitted. Plans and a description of the troop ship "Thomas" may be found in the Reference Handbook Medical Sciences (Wood, N. Y., 1901) Vol. I, in an article contributed by the author of this sketch. The administration and organization of the transport service are set forth in the "Regulations of the Army Transport Service" published by the War Department and amended in a subsequent revision.

## EXPERIENCES OF THE BRITISH ARMY MEDICAL SERVICES IN THE WAR IN SOUTH AFRICA.

By COLONEL RICHARD EXHAM, C.M.G.,

ROYAL ARMY MEDICAL CORPS; DELEGATE FROM THE  
BRITISH ARMY MEDICAL SERVICES.

**I**N the invitation sent to the British Army to send a delegate to your Annual Meeting, a wish was expressed that the delegate nominated might be an officer who had served during the war in South Africa: hence I have the pleasure of being present at your meeting. The wish I have alluded to has caused me to presume that you are desirous of hearing what improvements in our arrangements for the care of the sick and wounded the experiences of that campaign have shown to be desirable; and acting on that presumption I propose that the remarks I have the honor to address to you shall be of a general nature.

Although heavy guns, throwing large shells to a long distance have, of course, been used in many wars as guns of position and in siege trains, I think it is the first campaign in which such guns have been brought into the field and virtually used as field guns. The Boers made such use of guns throwing shells of 96 lbs. in weight with an extreme range of about 11,000 yards. Although these shells were not, as a rule, very destructive, they occasionally were so. As instances: in Ladysmith 8 men were killed and 9 wounded by a single shell; again 6 men were killed by another; and a third wounded 5 officers of one regiment. Shell fire of this nature necessitated the troops defending posts much exposed to it, having to live in deep and covered trenches, and this mode of life for a long period was certainly detrimental to health. But it is to the effects on medical arrangements in the field that I wish particularly to refer. It is obvious that, when guns of such long range are employed, we must expect the distance from front to rear over which casualties occur to be much greater than formerly, and thus extra labor must be caused to



those collecting the wounded. Further, long range fire will often prevent Field Hospitals, or even dressing stations, being established as near to the front as is wished and, as a result, wounded men have to be carried a longer distance to such hospitals or stations. The modern long range rifles, in a similar manner, cause the wounded in an action to be spread over a large area.

Another peculiarity in the campaign which occasioned the wounded to be spread over a larger area than usual, was that the whole of the Boer forces were mounted. They were thus able to move rapidly to any point of their position threatened; turning movements had consequently to be much wider than is usual and when large forces were engaged the flanks of our army were often very many miles from the centre of advance and from the lines of communication.

Although it is not to be expected that in any future wars the whole of any nation's forces will consist of mounted men, it is certain that the employment of such troops, particularly in the form of mounted infantry, will be much greater than has hitherto been the case and we, as army surgeons, must consider what effect this will have on our field medical arrangements. The experience of the campaign has shown the British Medical Officers that a large increase in the personnel of bearer companies is necessary. It has also made many of the opinion that in addition to the ambulances with these companies, one should form part of the regular transport of each mounted unit.

Although it is evidently necessary that the personnel of our bearer companies must be augmented, it is not considered that the increase should come from our trained Medical Corps men; on the contrary it is considered that the number of trained men might be reduced so as to set them free from hospital work and that only sufficient trained men need be kept in the bearer company to supply one man per stretcher and a few for duties of a technical nature. The men to complete the bearer companies would be either specially enlisted carriers or, preferably, men of Militia or Volunteer Medical Staff Corps or of the St. John Ambulance Brigade. As an instance of what can be done by such untrained men I may mention that in Natal a corps of about 1200

was formed by Colonel Gallwey, P.M.O. of the force in that colony, and these men removed the 800 wounded at the battle of Colenso so quickly that the field was cleared before dark. The P.M.O. of the force at Spion Kop reported that without their assistance the wounded could not all have been brought in for days as, owing to the difficult and hilly nature of the ground, the use of ambulances in the second line was impossible. As a further instance of good work done by these men, I may mention that when the force retired from Springfield to Colenso, a distance of 25 miles, they carried the whole of the seriously wounded men on stretchers; 12 men were allotted to each stretcher on this occasion. The stretchers had two extra handles at each side so that 6 men could carry it.

As you are, no doubt, aware, in the British Army there are two field medical units, bearer companies and field hospitals. Most of our officers are now, however, of opinion that these should be combined into one unit, as is the case in the Indian Army, and given some such name as "Field Ambulance," that they should be divisible into 4, or at all events, 2 sections, and that the equipment should all be marked by sections so as to admit of the unit being rapidly divided when necessary. Such division has very often been required in South Africa, particularly during the latter part of the campaign when the army was split up into numerous mobile columns.

Presuming that our bearer companies and field hospitals as at present existing are amalgamated, the duties of the combined units would be collecting the wounded and caring for them for only such time as to permit a hospital to arrive. This hospital would be probably something on the lines of our present "stationary hospital," which would become our real "Field Hospital," and would probably be so called. Each hospital would be equipped for 200 patients but would be capable of division into two sections. One of these hospitals would be regularly allotted to a division of 10,000 troops, but in addition, others would be kept on the lines of communication ready to be thrown forward to any place necessary. The hospitals allotted to divisions should be pushed forward rapidly as the troops advance and should be able to

relieve the "Field Ambulance" of its wounded in a day or two after a battle. These hospitals would in their turn evacuate into general hospitals which should be rapidly established along the lines of communication as the army advances. These general hospitals should be provided in sufficient numbers to accommodate sick and wounded at the rate of 10 per cent of the strength of the force. It is on these lines that the future medical arrangements of the British Army will probably be framed. I cannot too strongly represent the necessity of having these general hospitals ready to accompany, or if possible precede, an army to its base so as to be capable of being established in the rear of the army as quickly as possible as the army advances. The nearer to the army these hospitals are established the less will be the suffering of the sick and wounded and the less the difficulties in providing for them.

In South Africa we experienced great difficulties in consequence of these hospitals not having been ready in sufficient numbers in the early months of the campaign. Hospitals had to be improvised with whatever equipment could be obtained on the spot, and this entailed much work to the Medical Staff and took up time which might have been much better employed attending to the sick and wounded. I may mention that at the time of the relief of Ladysmith there were in Natal 6,500 sick and wounded, the majority of which had to be and were well provided for in improvised hospitals. At Bloemfontein alone we had at one time 4,500 sick and wounded and we dealt with 13,000 in one month; this could only be done by extending our general hospitals to about 1,500 beds each with such equipment and tentage as could be collected, but hospitals of this size are too large for thorough efficiency and, as at Bloemfontein, it is usually impossible to obtain suitable equipment on the spot. Provision should also be made beforehand for rapidly fitting out hospital trains so that they may be ready for use at the commencement of the campaign. When the lines of communication are long as was the case in South Africa, many trains will be required if the force is a large one. We had there seven, six of which were made up locally by converting the ordinary rolling stock of the railway into suitable

wards, etc., and the other was sent out from England. Even with this number a very large number of the sick and wounded going towards the base had to be carried in ordinary trains composed of saloon or such other carriages as were available, but such carriages are not really suitable for any except trivial cases of illness.

In the train sent from England three tiers of cots were provided but this did not prove satisfactory and I recommend only two tiers, as was the case in our other trains. In the English train the cots could be removed from the supports and this enabled patients to be placed on them in one hospital, removed to the train and from thence to their beds in another hospital with the least possible disturbance, which is certainly an advantage.

When it is necessary to move seriously wounded men or serious cases of sickness a moderate distance by rail, and hospital trains are not available, the plan adopted in the instance I am about to relate is a good arrangement and was found to incur the minimum of discomfort to the sufferers. When Ladysmith was relieved it was necessary to move 400 serious cases from our hospitals outside the town to one of our hospitals on the line of communication. Owing to the Boers having blown up the railway bridge over the river Tugela a hospital train could not be brought up; there was, however, a road bridge over the river and we had plenty of trucks in Ladysmith. In these we placed the patients on the stretchers on which they were carried from their hospital, the trucks were then conveyed to the river, over which the patients were carried by hand and then placed on other trucks in which they were conveyed to the line of communication hospital.

As our lines of communication were long and the troops scattered all along the line defending it, we had, in addition to our hospital trains, covered trucks fitted with stretchers either slung or resting on fixed uprights (the latter I recommend); these trucks were supplied with two orderlies, a stock of medical comforts, a small oil stove, water tank, etc., and, attached to passenger or supply trains, they travelled frequently between the lines of communication hospitals, bringing to the latter the patients picked up en route; they proved extremely useful.

When a large army has to be fed and otherwise supplied by a long single line of railway, as was the case in South Africa, hospital trains can, of course, be sent to the front only to a limited extent, but if these trains are utilized for bringing up medical supplies for the hospitals they do not actually replace a similar number of supply trains which could otherwise be conveyed. In South Africa we carried all our medical and surgical stores and also a considerable amount of hospital equipment up from the base in our ambulance trains.

It is also advisable that arrangements should exist for rapidly fitting out hospital ships, as these will certainly be required early in a campaign across the sea; if they are not ready in good time hospitals at the base become filled and a regular system of evacuation is not possible. Although a large proportion of men found unfit for active service can be sent in transports there are always many invalids for whom special accommodation is necessary. In addition to the "Maine" and the "Princess of Wales" and two other hospital ships sent out from England, 6 transports were converted at Durban in a very efficient manner into hospital ships. When transports were used for invalids they were fitted with a certain number of fixed cots and with swinging canvas cots and ordinary hammocks. In both classes of ships all the catering and usual ship work was carried out by the ship's staff and crew; consequently the medical service had only to provide the actual sick attendants. This proved a very satisfactory arrangement.

The greatest assistance to our medical units was experienced in South Africa by the establishment of convalescent camps on healthy sites along the lines of communication, to which patients were sent on discharge from hospital. The convalescents in these camps were allowed a special dietary and recovered more rapidly in them than they would have done if retained in hospital until fit for duty. In them they were re-equipped before rejoining their units.

Having now referred in general terms to the various medical units, I propose, without going into such detail as the items of medical and surgical supplies requiring reconsideration, to al-

lude to a few important articles of our equipment which the experience of the campaign has shown to require revision. In South Africa there are virtually no roads and such tracks as do exist are extremely rough. For such a country our army ambulances were quite unsuitable; indeed it is considered by many that the ordinary, long, springless wagon of the country, if it had plenty of hay or straw in it, was more suitable for the carriage of wounded men. Consequently prizes have now been offered by the British Government for the best two ambulances presented for competition. It is intended that the ambulance shall be capable of carrying 4 lying down or 12 sitting patients, with one orderly and a driver. The extreme breadth of the track may be 6 feet so as to admit of a passage way of at least 10 inches being provided down the centre of the wagon and thus permit of an attendant passing between the stretchers. It is intended that the stretcher attachments shall be provided with springs or insulators, as shall also the seats. India rubber tires are to be provided and the ambulance must travel without excessive vibration both with a light and full load, and to secure this check springs may be used. It is not proposed to much reduce the weight below that of our present ambulance as the experience of the campaign was that light ambulances did not stand the rough usage they were necessarily subjected to. But in addition to the ambulances for bearer companies and for general work, it is the opinion of most officers that we should have a light two-wheeled ambulance to accompany units of mounted troops. In South Africa we had a number of Indian Tongas and they were found very useful for this purpose, but, doubtless, a much more suitable two-wheeled ambulance can be devised. While referring to ambulances, I may mention that the Red Cross originally on our ambulances was much too small to be seen at such long distances as modern warfare requires. These crosses cannot be too large.

The bell tents used in our field hospitals, although they afford in proportion to their weight a large amount of accommodation for healthy men, or perhaps for trivial cases of sickness, certainly do not do so for serious cases and severely wounded men who have to be replaced on stretchers and it is not possible in

these tents for medical officers or attendants to properly get at the patients. It is considered that a rectangular tent can be devised which, weight for weight, will give better accommodation than bell tents. Although in South Africa a double fly tent for field hospital work is not an absolute necessity in consequence of heat, the extra fly adds much to the comfort of patients as a protection from the sun's rays and also during the very heavy rain storms experienced in that country. I consider that the advantage of a double fly tent is so great that such tents should be used.

Our hospital marquee, which is the tent of our general hospitals also proved to be a most unsatisfactory tent. It is supposed to accommodate 8 patients but will not even provide comfortably for six. A new tent, rectangular in shape, is now being devised which will accommodate comfortably 20 patients and the weight of the tent per patient will be far below that of the present marquee. The main object in increasing the size of the tent as well as its shape, is that it means great economy in nursing staff. When the sick are scattered over a large number of tents a far larger nursing staff is required than when they are collected more together.

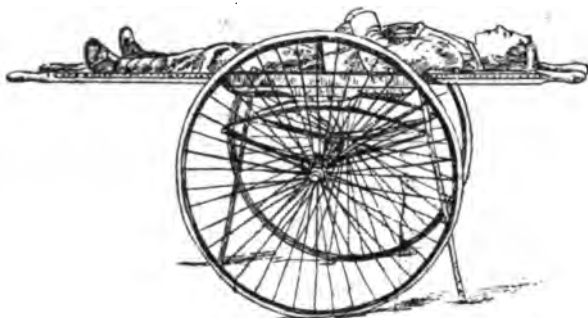
Large cooking ranges proved to be an absolute necessity in general hospitals and should always be provided.

"Thresh's" disinfectors were supplied to all our general and stationary hospitals: they proved very satisfactory for disinfecting clothing, bedding, etc., and will, I think, form a regular item of the equipment of such hospitals in future.

Some sort of an incinerator is required in every fixed hospital for the destruction of excreta of enteric fever patients. In many of our hospitals in South Africa various methods of boiling were adopted, but in the majority incinerators were subsequently erected and proved much more satisfactory. I regret that I have not with me drawings of the incinerator mostly used, but will endeavor to explain its formation and working to any member who wishes it.

Wheeled stretchers were much used, particularly in Natal, along the lines of communication for the purpose of conveying patients from trains to hospitals. A very good form of stretcher

carriage to take the regulation stretcher (See cuts) was devised by two of our officers. In our Indian hospitals we provide mattress and pillow cases which can be filled with straw, hay, etc. whenever available; they add much to the comfort of the wounded and



**Stretcher Carriage, Side View.**

The above stretcher carriage consists of an underscarriage built up of two light wheels with steel spokes and rims with rubber tyres and ball bearings. In the axle are two light elliptic springs to which is attached a transverse seat for the stretcher carrier proper. This is securely bolted on to the seat, and consists of two pieces of hard wood suitably worked and forming an angle frame. On the bottom side the stretcher poles rest, and the sides of the L formed by the carrier prevent most effectually any jerking or turning of the stretcher when once it has been laid in the carrier. The carrier is about 30 inches long but can be increased to any length desired. It has been found that this length is admirably suited for all purposes. To prevent the stretcher from any lateral or upward movement two buttons with tightening screws are attached to the top of the carrier on each side. When the stretcher is laid on the carrier, the screws are tightened, and the stretcher is held fast.

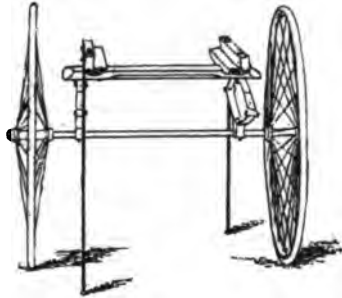
Two iron supports are provided, one at each end and on opposite sides of the carrier. These are lowered when it is desired either to place the stretcher on the carriage or remove it therefrom, which can be effected in a second; the carriage meanwhile remains perfectly still. When the carriage is in motion, the iron supports are turned up, and lie along the respective sides of the carriage, where each rests on a small clip. The great object of this stretcher carriage has been to obtain mobility, strength, and lightness, combined with efficiency and a ready and easy means of transport for sick and wounded, no matter where a patient has to be transported from. The loaded stretcher and wheeled carriage can be readily handled by one man on good roads and by two men in rough country. The springs and rubber tyres prevent any jerking being felt by the patient.

provided mattress. Hitherto no hospital clothing has been provided in our field hospitals but the experience of South Africa has shown that the provision of pyjama suits is extremely desirable. There is always a proportion of wounded whose clothing is so dirty, etc., as to make a change an absolute necessity.

are, therefore, worth carrying. In Ladysmith there fortunately was a large stock of these articles for the use of the troops in peace time. We were thus able by filling them with hay as long as this was available, and afterwards with coir and cotton found packed in bales for exportation, to provide every one of our 2,500 patients with an im-



As no doubt you are aware, our army in South Africa suffered much from enteric fever and this showed the importance of making every endeavor to supply a safe drinking water to the troops. A regular system of boiling and storing the drinking water was, after a time, adopted at all standing camps and with much success: this is a matter of easy arrangement, but, as you all know, to supply safe water at all times to troops actively engaged in the field is a very different question and presents such difficulties that they have never yet been surmounted. It



Stretcher Carriage, Front View.

was intended to supply portable Berkefeld filters to all units and they were supplied to a certain extent, but were found to be practically useless in a country like South Africa where the river water is nearly always so muddy that the candles get choked after a few strokes of the pump. Clearing the water with alum is too slow a process for troops on the march and requires larger vessels than can easily be carried. For standing camps a very efficient method for clearing water is that which we adopted at Lady-



Stretcher Carriage without Stretcher.

smith, where the water was extremely muddy. Rough wooden frames were made about 3 feet high and 3 feet square, several squares in a row: over these squares ordinary sheets were loosely spread so that there would be a shallow bag over each square. Underneath the rows of squares were shallow gutters of galvanized iron which conveyed the

water, as it dripped from the bags, into small receptacles (ordinary buckets) which were then emptied into storage tanks. Before pouring water into the bags wood ashes were sprinkled over the sheets. The result of this method was that

we obtained water so clear that the Berkefeld filters could be worked for hours without the candles getting choked.

Experience having shown that it is not possible to supply safe water to the troops in the field by filtration or by the ordinary means of boiling, a trial is now about to be made by the British Army of the French water cart, when filling which the water is pumped through a chamber containing potassium permanganate enclosed in asbestos. This is looked upon as merely a way of obtaining clear water which is subsequently to be sterilized by a Waterhouse-Forbes sterilizer. It is hoped by these means to arrange a system of supplying a safe water to the troops.

In conclusion I will briefly allude to two questions concerning the Geneva Convention; namely, what should be the rules governing the retention of field hospitals, etc., captured by the enemy and what should be the practice about carrying the arms of the wounded in ambulances and thus bringing them under the protection of the Red Cross. These questions will be brought before the meeting of the Convention in September next and, therefore, require previous consideration by the delegates who will attend that meeting.

At the conclusion of his paper, Col. Exham added: One little point I have not noted in this paper, but upon which, owing to the discussion which took place last night, I might make a few remarks. It is in regard to the employment of civil surgeons who have never received any military training. A great number of you expressed the idea that they are not capable of administering a hospital. That has been our experience in South Africa. However useful they may be in doing their professional duties along the lines of communication, they cannot fall immediately into military ways and understand how to improvise or start hospitals and keep them running. But I will give you the opinion of a very able, leading London (civil) surgeon. He was out with one of the civil hospitals that went to the war. He had exceptional opportunities of seeing the work of the hospitals and was given very large powers and privileges in going around to all the hospitals. He had charge of a civil hospital, a small one com-

paratively of only about 150 beds. He had a very able military medical officer to run that hospital. In articles which he has since published he attributes to the presence of that able military officer the success of his own hospital, and, moreover, he remarks that no civil surgeon is capable in war-time of running a military hospital; and even in the big hospitals where civil surgeons were employed for professional duties, he said there is a limit even in these hospitals to which civil surgeons should be employed, and considered that in South Africa that limit was passed. That, gentlemen, coming from an experienced civil surgeon, ought to be a very strong argument against relying too much upon civil aid in war time. In our Army at one time, among our very senior officers, there was a disposition to imagine that only a very small medical personnel was necessary to be maintained, and that in war time, as a very high officer in our Army, now retired, remarked: "I can at any time in war-time get as many civil surgeons as I want, and I don't want trained medical officers." I think the experience in South Africa has proved that we were right and that he was wrong.

#### ABUSES OF THE RED CROSS BADGE.

Deputy Inspector General Porter remarked at the last meeting of the British Medical Association, that in the war in South Africa regrettable recriminations took place on both sides regarding alleged abuses of the Geneva Cross. After making all possible allowances cases of deliberate abuse of the Cross occurred. Perhaps the wonder is they were not more numerous when one remembers the lax discipline and the character of many of the mercenaries in the enemy's ranks. Besides, the badge being of no particular size or material, any one could fashion it, and wear or hide it away at will; for example, it enabled recruits for the Boers to cross the Portuguese frontier at Komati Poort. Again, the Boers when hard pressed, as at Jacobsdal, calmly hid their Mausers, donned Red Cross badges, and so, evading capture, were able to fight once more and under more favorable conditions.

## NOTE UPON THE PATHOLOGICAL ANATOMY OF CEREBRAL CONCUSSION.\*

By M. NIMIER,

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MILITARY MEDICAL SCHOOL OF VAL-DE-GRÂCE;  
DELEGATE FROM THE FRENCH ARMY.

**T**HE pathological anatomy of cerebral concussion being still a mooted question, it occurred to me that this brief contribution would be of some interest to the Association, even though it afford but a negative result. It does not explain the *anatomical substratum* of the diffuse functional disturbances which, in our wounded by gunshot, are superadded to the clinical manifestations resulting from the destruction of brain matter by the projectile.

A soldier commits suicide with a Lebel rifle. The bullet

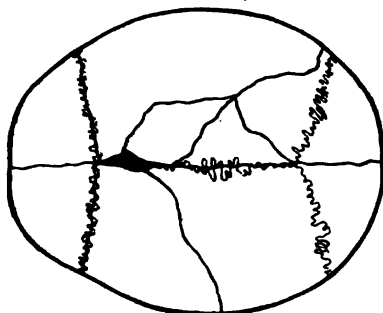


enters exactly at the centre of the suprahyoid region and escapes at the vertex, slightly to the right of the median line. In the scalp, the hole of exit is small and very little lacerated; it contains a small amount of brain matter. The skull does not appear deformed, but, when stripped of the soft parts, presents, as shown in the annexed diagrams, a hole from which six fissures radiate, two antero-posterior, two transverse, and two oblique backward and outward. These fissures, except the posterior, connect

Vertical Antero-posterior Section showing the  
Course of the Bullet.

\*Translated from the author's MS. by Lieut Col. Valery Havard, U.S.A.

with a circular horizontal fissure which almost completely detaches the cranial vault from the base at the level of the frontal bone and temporal fossæ. Lastly, the base exhibits, almost corresponding to the sella turcica, the hole of entrance from which radiate four fissures, three of which connect with the three anterior fissures of the vault, the fourth losing itself to the right of the occipital foramen.

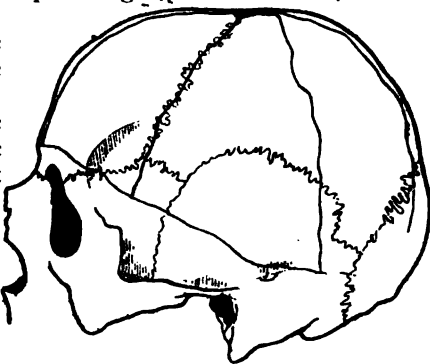


**Upper View of the Calvarium showing the Wound of Exit and Lines of Fracture.**

These multiple bony lesions show clearly that the action of the projectile was not confined to the two points encountered in its course. Let us now see if, likewise, the diffusion of the traumatic action is noticeable in the encephalic nervous mass.

In the cerebrum, the bullet has destroyed the optic chiasma and the anterior part of the right optical layer; it has perforated the corpus callosum a little to the right of its centre and ground. along an upward furrow twice its own diameter, the internal face of the right hemisphere as far as the front of the paracentral lobule. All the subarachnoid space is gorged with blood, at the base as well as upon the surface of the hemispheres; the two lateral ventricles and the fourth ventricle are full of it.

This hemorrhage alone indicates that the traumatic action of the bullet was not limited to its tract. But it remained to ascertain whether the macroscopic integrity of the nervous tissue was real, and this required an histological examination.

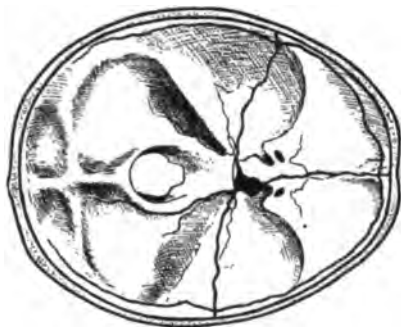


**Lateral View of Skull, showing the Wound of Exit and Lines of Fracture.**

Fragments from the optical layer involved, the right frontal and occipital horns, the protuberance, the medulla and cerebellum were removed and my colleague, Assistant Surgeon Dapter, examined them in accordance with the best technical histological methods used in such cases. The result, which seems to me interesting, was the total absence in these specimens, of all anatomical lesion of the nervous tissue.

Therefore a bullet endowed with powerful energy has passed through the brain, causing an abundant effusion of blood around and inside the cavities of this organ, without any diffusion of its energy to the nervous tissue, or at least without such diffusion producing any appreciable histological lesion.

Must we then conclude, from this isolated fact, that the clinical phenomena of cerebral concussion are not dependent upon any anatomical lesion, and see therein, for instance, simply the



**View of the Base of the Skull showing  
Wound of Entrance and Lines of  
Fracture.**

effect of a transient retraction of the neurax, with consequent suppression of nervous contacts? I am unwilling to draw any conclusion, but prefer to ask you, the opportunity presenting, to verify this observation and examine the condition of the nervous tissue at a distance from the tract of a projectile through the encephalon.

In my opinion, it would even be well to make such examination not only in a case of suicide by gunshot, with instantaneous death, but also, when possible, upon the cadaver of a wounded person who had survived the gunshot a certain period of time,—several days or even several weeks. We can, indeed, advance the hypothesis that outside of all primary appreciable lesion, the brain cells, from the effect of the traumatism, undergo a disturbance in their nutritive and dynamic exchanges, whence could secondarily result histological alterations. Do not the functional troubles persisting in some patients who suffered from concussion, support this supposition?

## CHARACTER STUDY IN THE EXAMINATION OF PERSONS FOR MILITARY SERVICE.

By FRANKLIN BACHE STEPHENSON, A.M., M.D., A.A.S.

MEMBRE TITULAIRE DE LA SOCIÉTÉ D'ANTHROPOLOGIE DE PARIS;  
MEDICAL INSPECTOR IN THE UNITED STATES NAVY;  
MEMBER OF THE PHI BETA KAPPA SOCIETY.

**I**T appears that modern thought has established the solidarity of the physical and mental in man, each being conditioned by the other. Hence, from what we see—with an experienced eye—in the physique of a man (and the same applies to all living things), and in his manner of using the various parts of his body, we may judge of his mentality, of his intellectual and moral tendencies. From the form of the different portions of the human body we may know the innate trend of the person—mental and moral. The effects of environment may be seen in the expression, not only of the face, but of all other parts of the body.

For example: a short, quick step indicates the same traits of mind. A slow, slouching gait does not mean force of character or promptitude in action. A low, narrow forehead does not tell of high moral qualities. The small or retreating chin reveals a very different future from that betrayed by a wide, prominent jaw. From thin bony fingers we do not infer constitutional vigor. Good proportions among the parts of the head, of the face, and of the entire body, shows excellence in general product. Extremes in form—plus or minus—have the same germinal origin as the peculiar or eccentric traits of character—mental or moral. A general average of relative size is prophetic.

Similar indications are found—by searching—in the head, hands, feet, manner of holding the body in various postures, the walk, gesture; and in all other manifestations, physical or mental. Observe the varied impressions you receive by different ways of

shaking hands. Such impressions are due to fundamental traits of character in giver and receiver.

The physician has learned to know the conditions of internal organs by what he may see outside of the body. Even the average citizen is aware of the significance of difference in form and expression of the good and bad man—physical, mental, and moral.

The varieties of botanical growth are recognized by their external marks. The grades of excellence in the lower animals are, likewise, noted by thoughtful observers. Are the results of these labors of value?

Why not use similar scientific procedure for the selection of the best in man?

There are minute directions for the strictly physical examination of recruits, wherein external signs tell of the possible force and endurance of parts out of sight. The mental and moral capacity are as surely constituent of the personality as the merely material; and much may be done, in recognizing their existence, from a study of gross appearances, and of form in detail.

Such kind of investigation may be applied to improvement in the manner of making examination of persons for the military service, thus procuring a better personnel; and consequently obtaining better work, through greater physical endurance, through higher quality of mental and moral ability.

There are books—treatises and manuals—in which may be found full details anent the science (principles) and practice (with results), of these ideas—showing their usefulness in the diagnosis of excellent qualities—material and spiritual.

When the individual is of an age to be guided by physical means or suasion, prognosis and treatment may become of service.

An experience of twenty years has caused the writer to have faith in this method.

When Washington advised his fellow-countrymen to choose gentlemen for military officers, he meant those who were men of character, as the word *gens* implies; for to establish a family, in the stern times of the ancient Roman republic required strength—physical, mental, moral. With our modern views of personal liberty and worth, we may not limit the *gens* to any class, save



those who are able, in body, mind and heart. For any sort of service, the best are none too good; and all available means should be utilized to secure such.

The ideas contained in the following critique are so pertinent that the author has taken the liberty of incorporating them with the initial portion of this paper.

It is hoped that the medical officers—and others—who are considerate enough to read the first few paragraphs of this article, will be interested in pursuing the argumentation to the end of the text.

The purpose of the book entitled *The Mental Functions of the Brain*, by DR. BERNARD HOLLANDER (Putnam's), is to prove that all the fundamental psychical functions are localized in the brain. For the most part, previous investigators have confined their attention to the intellect alone, but the author of the work before us considers also the emotions and passions of man, whether normal or abnormal, and undertakes to demonstrate their connection with the cerebral matter. It is pointed out in a preface that even recent text books describe insanity as a disease of the brain, implicating the whole of that organ. Whether a person be melancholic, violently maniacal, homicidal or a sufferer from the delusions of persecution; whether he be a kleptomaniac, a religious maniac or an imaginary millionaire—in every case it is assumed that the whole cortex is affected, whereas Dr. Hollander submits that the evidence here adduced by him shows that the principal varieties of mental derangement are localized in definite, circumscribed regions, and frequently are in the early stages at least, amenable to treatment. It is certain that, if future investigators shall confirm the author's observations, brain surgery will receive an immense stimulus; and it must be acknowledged that the data already amassed by Dr. Hollander, and now published, are so considerable as to open a new field for research.

It will be observed that the localizations are based chiefly on clinical and pathological investigations. Over 800 cases are here adduced illustrating not merely the recognized varieties of mental derangement, but all kinds of deviations from the normal mind, including manifestations of hunger and thirst. It is to be particularly noted that the author's localizations confirm those made a century ago by Gall, upon whose discoveries in the anatomy and physiology of the brain Spurzheim built the system of phrenology which has been so long discredited. A history of Gall and his doctrine is given in these pages, and should prove a revelation to the reader, if it be true, as Dr. Hollander asserts, that not one

man of scientific repute has ever written anything which would indicate that he had examined Gall's chief work. As to the evidence produced in this book after fifteen years of investigation, every candid person will echo the hope expressed by the author that it will be received with an open and unprejudiced mind, in view of the bearing which the facts exhibited may possibly have on mental science, on the study and treatment of lunacy, on the education of precocious and feeble-minded youth, on moral reform, the diminution of crime and many other problems affecting the well-being of the community.

The author of this book begins with a review of the present state of mental science, after which nearly 300 pages are allotted to a detailed statement of the results of his own investigations and those of other pathologists. The conclusions to which Dr. Hollander has been led are set forth in a final chapter, which is preceded by essays on the relations between the brain and the skull, on the history of Gall's doctrine and on the truth and usefulness of phrenology. It is some of the salient points of these discussions to which we would here direct attention.

#### I.

Is it possible to ascertain the relative size of the different convolutions of the brain during life by observing the different forms of the skull? That is to say, Does the shape of the skull harmonize with the conformation of the brain? Dr. Hollander answers: "The best modern authorities have now established as much as was ever claimed by Gall. I do not know of a single anatomist who denies that it is the brain which gives the form to the skull." It is well known that the want of entire and absolute parallelism between the outer and inner tables of the skull has sometimes been put forward as if it constituted an insuperable objection to the computation of the size of the brain by a measurement of the skull. Even admitting that such a want of parallelism is sometimes observed, Dr. Hollander suggests that the objection based on this fact will be minimized for those who know that the thickness of the skull seldom exceeds one to three lines (one-fifth of an inch, according to Treves), whereas the differences in the development of the brain are reckoned by inches. When a head is described as being high, wide or long, it is the brain that is developed in those directions and it matters little whether the enveloping cranium is a line or two thicker at some points or not.

We are reminded that some objectors to phrenology assume a patronizing tone, and supply the phrenologist with elementary information concerning cranial and integumentary irregularities:

all take for granted that the phrenologist has never studied the relations of the brain to the skull. Dr. Hollander undertakes to demonstrate that these self-complacent objectors have themselves neglected to study anatomical text books. He begins by quoting from Sir G. M. Humphrey's "Treatise on the Human Skeleton." "The skull is moulded upon the brain, and grows in accordance with it. The size and general shape of the brain may be estimated with tolerable accuracy by the size and general shape of the skull. The opponents of phrenology by denying this assertion do not in the least advantage their cause in the estimation of thinking persons, because the statement is of a kind at once to commend itself to common sense as being highly probable. The frontal sinuses and the projecting ridges, the inequalities on the surface of the skull, which have no correspondence in the interior, do not amount to much, and show only that allowances must be made, and that we must not expect in this way to form an accurate estimate; they do not affect the principle that the skull is moulded upon, and fitted to, the brain, and that its exterior does as a general rule convey pretty accurate information respecting the size and shape of that organ. The arguments against phrenology must be of a deeper kind than this to convince any one who has carefully considered the subject." Sir William Flower in his lectures at the College of Surgeons in 1879 said: "The skull is a fair index to the development of the brain in its different regions, and ought, therefore, to be studied." He added that the longer he lived he saw fresh beauty and meaning in every line and configuration of the cranium, and that the fact that he could recognize particular skulls presented to him as belonging to certain nations, was a proof that there existed certain fixed and uniform laws in regard to them.

Prof. Moriz Benedikt says: "The best insight into the psychological nature of man is obtained by two methods. The first investigates the historical development of mankind. The second method is biological, in so far as it teaches us to recognize the structure and functions of the brain—the outer and exact cast of which is the skull \* \* \* We must recognize that a special part of the brain belongs to every special part of the skull, and therefore we must acknowledge that every deficient evolution of a special part of the skull corresponds to a deficiency in a special part of the brain, and, consequently, there must be a deficiency in the function of the latter. \* \* \* It has been objected that there are in the skull very many accidental secondary prominences which have no counterparts in the brain. Fairly considered, however, this objection is not very material, inasmuch as it refers only to unimportant and changeable details and compara-

tively rare abnormalities. No scientific man, even if he does not altogether agree with Gall, disputes the doctrine that the construction of the skull is remarkably proportionate to the whole anthropological organization in brutes and in man; and the whole of craniology, as it is understood by anatomists and anthropologists, would have no meaning if this idea were not the leading one." To the same effect spoke Prof. Alexander Macallister, at the meeting of the British Association held in Edinburgh in 1892: "The largest part of the skull is that which is at once the receptacle and the protector of the brain; it is a part which, when unmodified by external pressure, premature synostosis, or other adventitious conditions, owes its form to that of the cerebral hemispheres which it contains." And again: "The study of the brain's development shows that the convolutioning of the cerebral hemisphere is primarily due to the connection and different rate of growth of the superficial layer of cells with the underlying layers of white nerve fibres; and that, so far from the shape of the brain being seriously modified by the constraining influence of the surrounding embryonic skull, the form of the soft membranous brain-case is previously moulded upon the brain within it, whose shape, however, it may be, to some extent, a secondary agent in modifying in later growth. We have also learned that the cerebrum is not a single organ acting as a functional unit, but consists of parts, each of which has its specific province; that the increase in the number of cells in any area is correlated with an increase in the size and the complexity of pattern of the convolutions of that area; and that this, in turn, influences the shape of the inclosing shell of membrane, and, subsequently, of bone." At the German Anthropological Congress which met at Canzig in 1891, J. Ranke stated in an address, "On the Relations of Brain and Skull," that the difference in the form of the skull are entirely due to the differences in the development of the brain.

Dr. Hollander next draws attention to the fact that Gall himself was the first to point out the irregularities of the skull in his article on the "Cranium," in the "Dictionary of Medical Science." It was presumption, therefore, on the part of anti-phrenologists, like Dr. O. W. Holmes, to write as if the founders of phrenology had been ignorant of elementary anatomy, Gall wrote: "The circumstance that the two tables of the cranium are not parallel in their whole circumference and at all periods of life would certainly be of the greatest importance if I had ever pretended to judge of all the minute shades of differences that exist in the convolutions of the brain. On the contrary, I have endeavored to acquaint my hearers and readers with all the circumstance in question. I have spoken of the frontal sinus, of the separation of

the two tables of the cranium in men and in animals. I wrote upon it in my article, 'Cranium' in the Dictionary of Medical Science." I was the first to mention that it was impossible for us to determine with exactness the development of certain convolutions by the inspection of the external surface of the cranium. I was the first to treat in detail the variations in the thickness of the cranium which occur in old age, in insanity, &c. I was the first to teach that in certain cases the external table of the cranium is not parallel to the internal one. I have called the attention of anatomists to all these circumstances. Is it, fair, then, of these anatomists to turn these facts into weapons against craniology? Why had they not the frankness to state by what means I have removed many of these difficulties, and to confess that I pursued my researches with candor, and considered the subject in all its aspects with impartiality." Dr. Hollander submits that the best proof that there really exists a uniform correspondence between certain forms of head, skull or brain and certain characters of mind is found in the numerous confirmations that the localizations made by Gall have received from clinical evidence in recent times; to which confirmations Dr. Hollander would add the testimony furnished in the 800 cases described in the book before us.

## II.

In a chapter on "The Significance of Cranial Contours," our author quotes the judgment pronounced on practical phrenology by Dr. Henry Maudsley, lately professor of medical jurisprudence in University College, London. "All broad-headed people," Dr. Maudsley writes, "that I have examined are very selfish; that is to say, all who have the head broad in proportion to its length." He accepts the observation of the phrenologists that "an undue preponderance of the breadth of head throughout the region in which they place the propensities indicates with certainty an animal self-love, which can scarcely be trusted at all times to adopt only fair means for its gratification." Undue preponderance, be it observed, for "it is justifiable to expect a favorable result, even with a rather broad head which has a proportionately good length and which has, so to say, the power of its length placed in the anterior half thereof. And why? Simply because there is in the front the greatest natural power, the force of intellect, which by exercise and development is able to control the objectionable propensities indicated in the animal broadness of skull."

To the question, What constitutes a noble head? Dr. Maudsley replies: "From the forehead the passage backward above should be through a lofty vault, a genuine dome, with no disturbing depressions or vile irregularities to mar its beauty; there

should be no marked projections on the human skull formed after the noblest type, but rather a general evenness of contour." On the question, What is a brutal head? Dr. Maudsley remarks: "The bad features of a badly formed head would include a narrowness and lowness of the forehead, a flatness of the upper part of the head, a bulging of the sides toward the base and a great development of the lower and posterior part; with those grievous characters might be associated a wideness of the zygomatic arch, as in the carnivorous animal, and massive jaws. A man so formed might be expected with some confidence to be given over hopelessly to his brutal instincts."

Is a man, then, hopelessly chained down by the weight of his inheritance? "By no means," Dr. Maudsley answers, "for there is something besides inheritance which makes fate, and that is education. It is a physiological law that the brain throughout infancy, childhood and youth, grows to the circumstances which it is placed among; and, therefore, the actual development of a brain may be much influenced by the sort of nutriment supplied to it as long as it grows. It would be rash, indeed to venture to limit the effect which a right, reasonable, moral, physical and intellectual education may have on the worst inheritance. But, given an individual at the meridian of life, with a bad inheritance and a bad education, the benevolent enthusiast may, indeed, hope for the individual's reformation, and, all honor to him, labor for it; but the careful observer will be prone to smile at his expectations, and, regarding them as a devout imagination, to compare them to those made to wash a blackamoor white."

Here we would add that in a lecture reported in the *British Medical Journal*, Prof. Graves of Dublin pointed out that in all cases where the difference between the intellectual powers of the men examined is extreme, "there also we invariably find a striking difference between the form and size of their skull, the most highly gifted always presenting a greater relative proportion of brain. So far, then, must every reflecting man be a phrenologist --so far must all concede that cerebral development and mental powers are mutually proportioned to each other. But can we advance further than this general proposition, and may we not affirm that the anterior portion of the brain is proportioned in size to the intellectual faculty? Experiments on animals and observations on man afford very striking reasons for arriving at such a conclusion which tends to establish the leading principle of the phrenologist, 'that different portions of the brain perform different intellectual functions.' It would appear certainly that the anterior portion of the brain is devoted to the intellectual faculty,

but that the strength of the moral feelings and animal propensities is regulated by the development of the remaining portions of the encephalic mass."

### III.

In his twelfth chapter the author brings forward further testimony to the truth and usefulness of phrenology from eminent medical men, all specialists for the treatment of the insane, who have been so misguided as to place belief in those who have been described by *Blackwood's Magazine* as "those infernal idiots, the phrenologists," and to adopt what the *Edinburgh Review* has denounced as "thorough quackery" and "despicable trumpery." The *Journal of Medical Science* in July, 1879, called Dr. Conolly as a witness: "To those who were personally acquainted with Dr. Conolly, his favorite opinion of the system of Gall and Spurzheim is well known. In his 'Indications of Insanity,' he maintains that 'the first principles of phrenology are founded in nature,' and adds: 'I can see nothing which merits the praise of being philosophical in the real or affected contempt professed by so many anatomists and physiologists for a science which, however, imperfect, has for its object the demonstration that for other functions [than the intellectual], the existence of which none can deny, there are further separations and distinctions of hitherto unexplained portions of nervous matter.' In a letter to George Combe [the eminent English phrenologist] Dr. Conolly expresses his 'conviction of the great usefulness of habitual regard to the principles of phrenology, especially in my department of practice and of the confusion and imperfection of the views which seem to me to be taken, both of sound and unsound mind, by those who reject the aid of observations confirmed now by vast experience, and most of which may be daily verified in asylums for the insane. I am also convinced that attention to the form of the head, conjoined with that cautious consideration of all other physical circumstances, which no prudent phrenologist disregards, will often enable the practitioner to form an accurate prognosis in cases of mental disorder, and to foretell the chances of recovery or amelioration, or of hopeless and gradual deterioration.'"

We pass to the testimony of Sir James Cox, her Majesty's Commissioner in Lunacy. This testimony was outlined in the presidential address delivered at the Royal College of Physicians, London, July 26, 1878, by Sir J. Crichton-Browne. "From the commencement of his career, Sir James Cox interested himself in insanity. During the earlier stages of his professional training, he enjoyed no opportunities of coming into contact with the

cloistered insane, nor of observing the modes of treatment then resorted to, as lunatic asylums were not in those days open to students, and were unprovided with medical assistance; but this disadvantage was, to a great extent, compensated by his having acquired from his relatives, George and Andrew Combe, a thorough knowledge of phrenology, which—not then fallen on evil days of charlatanism, and into the evil companionship of mesmerism—encouraged the accurate observation of mental states, accentuated the relations subsisting between these and states of the nervous system, and had even some curious glimpses of foresight into the revelations of modern physiology. He saw the phrenological method of inquiry applied in cases of insanity and of peculiar turpitude in the communities of lunatics and criminals that he visited during a long sojourn on the Continent, and the influence of the information thus obtained, coöperating with the natural bent of a comprehensive but unimaginative mind, may be discerned in all his subsequent public and official acts." Let us look next at the conviction expressed by W. A. F. Browne, her Majesty's Commissioner in Lunacy for Scotland, father of Sir James Crichton-Browne: "To those who are acquainted with the doctrines of phrenology the extent of my obligations will be readily recognized; and to those who are still ignorant of these doctrines I have to offer the assurance that insanity can neither be understood, nor described, nor treated by the aid of any other philosophy. I have long entertained this opinion. I have for many years put it to the test of experiment and I now wish to record it as my deliberate conviction."

In Guy's Hospital Reports for 1879, Vol. 24, will be found set forth the reflections of Sir Samuel Wilks, M. D., lately President of the Royal College of Physicians, London: "It seems astonishing at the present time, when phrenological societies have ceased to exist and we look calmly back at the achievements of their members, to contemplate the bitter animosity which was exhibited toward them by their opponents in all classes of society. Physiologists simply ignored them and looked upon the attempt to apportion out the brain into organs corresponding to the functions of the mind as gratuitous and fanciful whilst the literary and religious public became their bitterest antagonists, because they made mental processes depend upon physical organization.

\* \* \* In myself considering phrenological works in an unprejudiced spirit, I cannot but be struck with the great object which the writers presented to themselves and the mode in which they proposed to prove the truth of their doctrine. Their object was the same as that which is now considered most rational.



They discarded the notion that the brain was to be regarded simply as associated with the mind and there left, but they looked upon it as a compound and complex organ. They were the first to replace the old method of anatomists of slicing up the brain by unfolding and dissecting it. They showed that it was made up of parts, each having its own function. They erred, no doubt, in hastily framing a system whose correctness did not admit of proof [the system was founded by Spurzheim, not by Gall]; but out of it arose discussions on the different faculties of the body and mind which must have made the phrenological societies in London overflow with interesting debates. They discussed the subject of language in a manner which had never before been attempted, as well as coördination, time, the muscular sense, the feeling of resistance, and kindred subjects. Aphasia, indeed, seemed clearly understood, and language was located by them in the region where physiologists are now agreed to place it. If phrenologists had not stated so strongly their belief in the existence of separate organs in the brain, but had used their system merely as an hypothesis, no objection could have been urged against it, for it developed, for the first time, a number of theories as to the nature of the different faculties of the mind. The transactions and reports of the old phrenological societies give accounts of debates on subjects of the deepest interest, such as can nowhere be found in the records of other learned societies." Sir Samuel Wilks also recalls that the electro-biologists, a class of practitioners produced by a fusion of phrenologists with mesmerists, used both to teach and practice what the most advanced physiologists are now supposed to do in their laboratories when they excite certain convolutions of the brain by the galvanic current.

It seems worth while to hear some other authoritative testimony on the same subject. Sir William Turner, professor of anatomy in Edinburgh University, writing in 1866, observes in "The Convolutions of the Human Cerebrum, Topographically Considered," that "the precise morphological investigations of the last few years into the cerebral convolutions have led to the revival in Paris of discussions in which the doctrine of Gall and his disciples—that the brain is not one organ, but consists of many organs—has been supported by new arguments, and the opinion has been expressed that the primary convolutions, at least, are both morphologically and physiologically distinct organs." Sir Frederick Bateman testifies in his book "Aphasia, or Loss of Speech," London, 1890, that "in spite of all that has been written in depreciation of his labors, beyond all doubt his researches gave an impulse to the cerebral localization of our faculties, the effect of which is especially visible in our own day, and

I look upon his work as a vast storehouse of knowledge, and as an imperishable monument to the genius and industry of one of the greatest philosophers of the present age."

We quote, finally, the opinion expressed by Havelock Ellis in "The Criminal," London, 1890: "Gall thrust aside forever the credulous fancies of the physiognomists; and he has been described, not altogether without reason, as the founder of the modern science of criminal anthropology. He was certainly its most brilliant pioneer. \* \* \* Gall studied the brain, sought to differentiate the functions of its various parts, and the effects of its varying development on the skull." Havelock Ellis goes on to recall that "for Gall the varying development of the brain was the cause of the divergent mental and moral qualities of the individual; he was firmly convinced that all the facts of psychical life are rooted in the physical organization; he wished to write the natural history of every primitive, moral, and intellectual force, in health as well as in disease. To the best of his ability he carried out his programme in detail, by an unceasing study of all the varieties of the brain and of the living head that he could find; he pursued his studies throughout Europe, in lunatic asylums and in prisons, as well as among the ordinary population. and he foresaw the extent of the applications of the science he was opening up to medicine and to law, to morality and to education. While his work extended far beyond the borders of what we should now call criminal anthropology, he devoted much attention to the problems of the criminal organization, and even to its varieties, many of his observations according well with the results of recent investigations." Ellis recognizes that "more than this, Gall clearly advocated a method of dealing with the criminal which is now rightly regarded as the only right and reasonable method. 'There can be no question,' Gall said, 'of culpability or of justice in the severe sense; the question is of the necessity of society preventing crime. The measure of culpability and the measure of punishment cannot be determined by a study of the illegal act, but only by a study of the individual committing it.' In his great work, *Les Fonctions du Cerveau*, Paris, 1822, Gall has summed up his conclusions."

#### IV.

Now let us see what Dr. Hollander believes himself to have accomplished in the book before us. In the concluding chapter we are reminded that Gall, proceeding on strictly positive and inductive lines, labelled the regions of the brain in a rough-and-ready fashion with the names of habits or actions he found specially associated with the developments of the respective parts, as,

for example, "mimicry," "homicidal mania," &c. Spurzheim defined a more abstract conception of the functions of the cerebral parts, and the terminology invented by him was adopted by Combe and the Edinburgh school; but, although the terminology may have been more philosophical, it did but retard the recognition of phrenology, inasmuch as Gall's original observations were no longer identifiable under such terms as "imitation," "destructiveness," &c., hence, they could not be easily verified. Dr. Hollander has himself made no attempt at a scientific revision of the terms employed, contenting himself with showing that Gall's crude observations have been confirmed by recent experiments and researches. He is quite alive to the fact that the labors of many qualified observers and experimenters will be needed to construct thereon a complete system. While convinced, however, that certain of the "localizations" attempted by him may require a great deal more of scientific evidence, such as has been furnished for "melancholia," "violent mania," "mania of persecution" and some other identifications of emotions with brain centres, the author ventures, after fifteen years of accumulated research, to formulate as highly probable the following propositions: First, the pre-frontal lobes are concerned with purely *intellectual* operations. Secondly, the temporo-sphenoidal lobes are in some way connected with the *propensities* common to man with the lower animals. Thirdly, the parietal lobes and the posterior part of the frontal lobes are involved in the manifestation of definite *emotions*: while the occipital lobes bear a relation to the domestic and social *affections*. In Dr. Hollander's opinion it may be further maintained that size of brain-mass bears a proportion to the power of manifestation, and that two brains or skulls differing in the regions above mentioned will differ in character accordingly. "Take," says the author, "the masks, brains or skulls of half a dozen persons afflicted with a deficiency of some definite mental faculty or emotion or passion, on the one hand, and, on the other, those of half a dozen persons who have excelled in such faculties; then jumble them together, and any individual tolerably versed in Gall's doctrine will find no difficulty in differentiating the two classes."

It is, of course, to be understood that the work before us is not a text-book on phrenology. It was not the author's aim to demonstrate the truth of Gall's doctrine through its whole scope and in all its details. He simply claims to have furnished modern specialists in lunacy the key to many of the mysterious problems of mental science. He concedes that the key offered may be rude and have some strange twists in it, but he submits that it is a key, nevertheless, which, despite its defectiveness, may be

found to correspond with many of the wards of locks hitherto unopened by science and philosophy. He thinks that specialists should give the present work at least fair consideration, seeing how important it is to diagnose correctly the earliest and slightest deviations from the normal psychic functions. He is far from asserting that phrenology is a science to-day. He admits that it will be a science only when it shall have been proved such by all the different methods of research instead of by the single method of a comparison of heads. He believes, however, that if all who are in a position to turn it to account would keep phrenology before them as a "theory," as a working hypothesis, a notable amount of progress would speedily be achieved.

In this book notice by M. W. H., the famous reviewer for *The New York Sun*, "so much has been said and so well said, that anything more would seem superfluous," inasmuch as this contribution is designed to merely call serious attention to the subject.

#### A CANADIAN VIEW OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES.

THE *Canadian Military Gazette* remarks that last summer the Association of Military Surgeons held its annual sessions for 1902 in Washington, and by invitation, delegates from the medical staffs of the principal armies of the world were present, took part in the proceedings, and expressed their views, etc., on the subjects which came up for discussion. Surgical and medical science—especially as it relates to operations in the field—was largely benefited thereby; more, there was a marked increase of the fraternal feeling which exists amongst members of a great profession, though drawn from various countries, and enrolled in armies which any month may be ranged in hostility to one another; and, better still, the humanitarian spirit was further developed, for there it was felt, and there the principle was still further impressed upon those present, that in the interests of all, surgical aid should be to the fullest possible extent cosmopolitan, that friend and foe alike should be objects of the true physician's solicitude, and that, therefore, the men of every army are interested in the efficiency of medical men and medical appliances belonging to forces other than their own.

## REPORT OF CASES OF BOLO WOUNDS.

BY CAPTAIN HENRY CLAY FISHER,  
ASSISTANT SURGEON IN THE UNITED STATES ARMY.

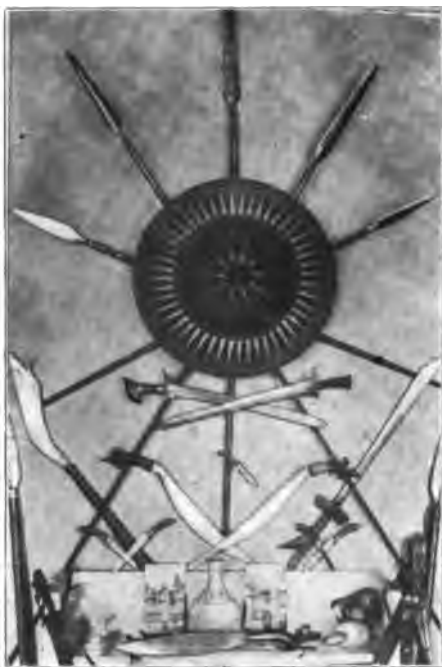
**I** HAVE the honor to submit the following report of cases of bolo wounds that came under my observation while surgeon in charge of the Military Hospital at Cebú, Island of Cebú, Philippine Islands:—

1. Juan —, native guide, while attending a cock fight in the outskirts of Cebú was attacked by insurgent sympathizers and slashed with a bolo across the back, incising the skin and superficial tissues from one side to the other over the scapula with an uncut interval in the depression over the spinal column. After disinfection and a lengthy suturing, the incision made an uneventful healing.

2. Copras —, a native, cut with bolo while resisting robbers at Talisay, Cebú, P. I., was admitted to the hospital June 28, 1900, two days after the accident. The following diagnosis was noted, 1. Incised flesh wound, moderately severe, posterior surface upper third left leg, 4 inches long. 2. Incised flesh wound, moderately severe, posterior surface upper third right arm, 4 inches long. 3. Incised wound, left elbow, severe, severing olecranon process and attachments. As he left the hospital on the 3rd day after his wounds were dressed it is supposed he was doing well but his subsequent history was lost.

3. Sergeant — of Battery C, 6th Artillery, while in the suburbs of Cebú walking with a comrade was attacked by a crowd of bolomen. Throwing up his left arm to ward off a blow aimed at his head a bolo made a clean cut through all tissues and bones of his forearm two inches below the elbow, with the exception of about 2 inches of skin; the same blow caused an incision from the middle of his forehead through the inner angle of the orbit to the right cheek severing the outer table of the frontal bone. Another blow upon the left shoulder cut off the acromion process, all of the deltoid muscle and other tissues upon the outer surface of the arm

cleaving the upper third of the humerus and incising it to a depth of half an inch. The Sergeant being unarmed knocked down his assailant with his right hand, started to run and fell receiving another severe incised wound in the outer side of the upper third of his right thigh 4 inches long, down to and incising slightly the femur. The insurgents ran off and the Sergeant walked a distance of 500 yards to the hospital holding his all but severed left forearm in his right hand. The regions of his wounds were carefully disin-



**Trophy of Filipino Weapons.**

The crossed knives just below the shield are Moro kris, one a serpent kris, the other a straight kris. The curving bellied knives just below are bolos from the island of Cebu,—there are various shapes of bolos according to the locality. Lying on the shelf, in front of the water bottle, is the weapon of which every Moro carries one or two in his sash, if he has not a kris,—the barong. To the left and right respectively are a beheading knife and a capitan. The kris daggers are carried by women.

fected and all possible aseptic precautions taken. An attempt was made to cover the stump of his already amputated left forearm with a skin flap taken from the severed member, there being a connection of about 2 inches of unsevered skin. The other wounds were sutured, and healed by first intention. The skin flap of the left forearm sloughed but there was no pus formation. The Sergeant was up, feeling strong and apparently doing well when on the 12th day symptoms of tetanus developed and he died on the fourth day thereafter. Undoubtedly the infection was incurred at the time of the original injury; the onset of the symptoms of tetanus was delayed but within the recognized in-

cubation period. There had been no suppuration in his wounds and no other cases of tetanus occurred at the hospital.

4. Private —, of Company C, 44th U.S.I.Vols., was admitted September 4, 1900, with severe incised wound, 5 inches long, located on the left side of the back, opposite floating ribs; slight punctured wound  $\frac{1}{2}$  inch long, located on the right side of the back, opposite floating ribs; punctured wound one inch long, located on the anterior surface, lower third, left shin, slight. Cut with a bolo in action against insurgents, near Carmen, Island of Bohol, P. I., August 31, 1900. This soldier was returned to duty November 6, 1900.

5. Private —, of Company C, 44th U.S.I.Vols., was admitted September 4, 1900, with severe incised wound five inches long, located on the anterior and inner side of left hand, with compound fracture of the middle 5th metacarpal bone of the left hand. Cut with a bolo in action against insurgents, near Carmen, Island of Bohol, P. I., August 31, 1900. He was returned to duty November 10, 1900.

6. Corporal —, of Company C, 44th U.S.I.Vols., was admitted September 4, 1900, with severe incised wound, six inches long, extending through the middle of left ear and located along the neck downward and backward, with compound fracture of the mastoid process and with a severe incised wound, about seven inches long, of right arm and forearm, opening back of right elbow joint. Cut with bolo in action against the insurgents, near Carmen, Island of Bohol, P. I., August 31, 1900. This soldier was transferred to another hospital October 27, 1900, and was treated in other hospitals between the date last mentioned and February 19, 1901, when he was discharged the service on surgeon's certificate of disability because of fixation of right elbow joint at an angle of 135 degrees, from a bolo cut, posterior surface of arm, from three inches above to two inches below elbow, penetrating the joint. Deafness in left ear, one-half, caused by a bolo cut located from a point one inch anterior to ear, through the external ear backward, five inches, causing partial occlusion of the external auditory meatus.

7. 1st Sergeant —, of Company A, 43 U.S.I.Vols., was ad-

mitted November 9, 1900, with bolo wound located in the lower left inguinal region, passing through the superficial structures, and striking the crest of the ilium, severe. He was injured during an attack on Polo, Leyte, P. I., May 29, 1900, and was transferred to another hospital between the date last mentioned and February 27, 1901, where the diagnosis was recorded as punctured bolo wound in the left iliac region, which extended from a point on a level with, and one inch to the left of, the anterior superior iliac spine, downward and inward for  $1\frac{1}{2}$  inches, parallel to Poupart's ligament. He arrived at the Presidio, San Francisco, California, February 27, 1901; was examined and found to be convalescent and able to travel, and was discharged the service September 6, 1900, because his services were not required, without admission to hospital.

8. Private —, of Company C 44th U.S.I. Vols., was admitted December 21, 1900, with incised wound, slight, located on the lower third, outer side of the left forearm, three inches long and a punctured wound located on the anterior surface of the left shoulder,, penetrating the apex of the left lung, severe, cut with a bolo during engagement with the insurgents at Hagner, Island of Bohol, December 15, 1900. He was returned to duty January 21, 1901.

#### CONDUCT OF THE NAVAL MEDICAL OFFICER DURING AN ACTION.

**I**N the din of battle, with men falling thick around their guns, temporary aid is all the surgeon can render. When the last gun is fired his real work will begin, and it will be imperative on him to expose himself to risk of injury or death during the action as little as possible. By moving about, however, in the protected parts of the ship with such necessities as he can carry, he can render much useful service. To remove the seriously wounded from the various decks to the dressing stations during the action will be impracticable. For many reasons the use of stretchers will be rendered impossible, and all the bearers can do will be to assist by hand the less seriously injured to the dressing stations.—*Staff Surgeon Colborne, R.N., in the British Medical Journal.*



## SOME PRACTICAL SUGGESTIONS ON TROPICAL HYGIENE.

By MAJOR HENRY P. BIRMINGHAM,

SURGEON IN THE UNITED STATES ARMY.

A GENERAL discussion of the subject of tropical hygiene would naturally lead to matters that might take up volumes, but my desire on this occasion is to consider only a few of the points—in a practical way—that more nearly concerns us as military surgeons. To those of us who have seen tropical service, I have little if anything new to offer, but to those who have not and who may—under existing conditions—be sooner or later called upon for such service, the points to be discussed may be of interest.

The first part of the subject to be considered is that of recruitment, and it is easily the first in importance. No matter what precautions may be taken to maintain the health and efficiency of any command, the work will largely go for naught, unless the physical make up of the personnel is at least fairly satisfactory, and that this is doubly true for the tropics goes without saying.

From a somewhat extended hospital experience in our tropical possessions I believe I am safe in saying that about fifty per cent of the soldiers who were invalided home or who died on those islands were men who never should have been sent there, and what is of more importance, a careful physical examination of those men by medical officers conversant with tropical conditions would have unquestionably resulted in their rejection.

These defectives might be classified under the following heads:

### I. The immature youth.

The number of undeveloped boys ranging in age from 17 to 21, met with in the hospitals, whose only chance for life

lay in building up their strength sufficiently to admit of their being put on the first transport sailing for home, was simply deplorable.

## II. The man of poor physique.

Under this head should be comprised all men who do not absolutely and unqualifiedly meet the requirements of Greenleaf's *Epitome of Tripler's Manual* in the matter of weight, height, chest expansion and general physical development.

Among this class I desire to invite particular attention to the tuberculous subject, for although he may not always have apparent physical stigmata, for the most part he has, and he is the least desirable of all. I have not at hand the statistics, but the number of men who either died of, or were sent home for tuberculosis formed quite a large percentage of the general non-effectiveness in the Philippine Islands.

It is practically signing the death warrant of an individual with even the most remote tuberculous tendency to send him to the tropics.

## III. The aged and the neurotic:

I have included these two classes under the same head for the reason that many narcotic and alcoholic neurotics show undoubted evidences of premature senility, and conversely the fact of a man's presenting himself as a recruit after middle age is presumptive evidence that his life has been more or less a failure, and in such cases this is very often due to the causes set forth above.

Life in the tropics has a pronounced depressing effect on the man from the temperate zone, and this is particularly the case for one who is subjected to hard service or unwonted conditions. Neurasthenia in its various forms, and often of decided severity was a common ailment—most often as an accompaniment of, or sequel to, some of the depressing diseases, such as malarial fever and dysentery, but now and then cases were met with where the climatic conditions seemed to affect the nervous system alone, and these latter not infrequently eventuated in some form of insanity.

The number of this combined class, viz:—The aged, or pre-

maturely aged, and the neurotic found in the hospitals was always large, not so often from these conditions *per se*, but from the ordinary tropical diseases to which their low resisting power made them easy victims. Very few of these men were ever returned to duty; they either died or were sent home.

The men that I have particularly in mind were largely those who were recruited under the volunteer act of March 3, 1899, to serve in the Philippines until June 30, 1901, and as they were most hastily recruited (some of the regiments were enroute to the Islands within a few weeks after receiving the order for organization) physical perfection was hardly to be expected. The lesson learned, however, was an impressive one and should not be lost sight of.

There were some notable exceptions in these regiments, the comparatively small sick list showing that great care, and perhaps some good fortune had attended their recruitment.

To summarize in the matter of the tropical recruit, I would to begin with unhesitatingly place the age—and that with few if any exceptions between 25 and 35.

Tropical service demands mature bone and sinew of the best quality and while a certain percentage of men above and below this age, who would prove effective, might be secured, I am convinced that the best interests of the service would be conserved by a close adherence to the above age limit.

The prescribed regulation of weight to height should be absolutely adhered to, and the slim, lanky individual invariably rejected. The excessively tall man, no matter what his weight may be is undesirable, for in the tropics he is very prone to lose weight and degenerate into the tall lanky weakling above referred to. The obese man, or the man with a paunch should of course not be considered. The examination of the chest should be carried out with the most scrupulous care, and all individuals with weak hearts, relatively deficient chest expansion, any tubercular tendency, whatsoever, or other chronic ailment of the chest or contained organs, rigidly excluded.

The aged, or prematurely aged man, the neurotic and the alcoholic should be unhesitatingly cast aside, no matter what his age or apparent physical perfection may be.

It may be said with truth that it is often difficult or, at times impossible to discover these neurological defects, but they should always be carefully looked for, and if the case is at all questionable the Government should, by rejection, be given the benefit of the doubt.

Marked caries of the teeth should always be cause for rejection, not only for the reason that insufficient mastication is often the starting point of grave disturbances of the intestinal tract, but furthermore for the reason that in the comparatively young this defect is presumptive evidence of some constitutional vice which the life of a soldier in the tropics would be sure to accentuate.

The condition of the skin should be most carefully observed, and any evidence of acute or chronic affection of the integument should cause the applicant to be rejected. The importance of this will be referred to later on.

This summary may seem on the whole rather sweeping, but the nature of the service during active operations in the field, in the tropics, is such as only the physically fit man can endure, and the physical weakling will not only be a burden to be cared for while in the service, but will inevitably be a factor in increasing our already large pension list afterward.

The next part of the subject to be considered is the matter of clothing. A great deal has been written (and some of it not overly wise) on the equipment of our troops on our first foreign expeditions, viz, those against Santiago and Manila; and among other things, the fallacy of sending troops to the tropics, with clothing intended only for the north temperate zone, has been more or less severely denounced. Notwithstanding all this however, the fact remains that many a man who had discarded his blouse and blanket, during the heat of the day, on the advance to the front, thanked his stars that he had at least his blue-flannel shirt to protect him from the chill that comes before dawn, even in the tropical night.

So that granting that our troops were somewhat overburdened by heavy clothing, and few will question the fact, it was

not altogether an unmixed evil, and although at the time, we were *per force* compelled to err, we rather erred on the right side.

The question of supplying proper clothing for the soldier in the tropics is a many sided one and depends largely upon the work he may be called upon to do, but as field service is the most important by far, and that for which he was primarily enlisted and, as furthermore it is the time above all others when he is subjected to situations calculated to try his strength and endurance, often beyond the breaking point, I will consider first the necessities that pertain more nearly to active operations in the field and discuss briefly later on the dress for permanent camp or garrison.

To begin with, the almost irresistible tendency on the march, in intensely hot weather, to discard every thing that can be thrown away, must always be borne in mind, and with this in view the garments worn should be of such weight and texture as to not unduly oppress the man during the day and at the same time afford him some protection from chill during the night. A shirt and trousers is all a man will willingly wear under conditions such as we are discussing, consequently these two garments should be made to fulfill as many of the necessary requirements as possible; presupposing that in many instances he will be compelled to sleep on the field with no other protection than the clothing he has marched in. I have in my mind a suit of khaki-colored flannel, which, I believe would not be a bad combination for "hiking" in the tropics; constructed somewhat as follows. The pattern of the shirt to be much the same as that of our regulation blue-flannel shirt, and the trousers shaped after the style of the ordinary riding trousers, reaching only to the ankle and slashed and buttoned at the bottom, so as to admit of their being worn inside the socks, or rolled above the knee as occasion might require. The garments to be connected by loops sewed to the waist of the shirt; these loops passing through slits in the waistband of the trousers and through which the cartridge belt could be passed, thereby sustaining the weight of the belt in large part from the shoulders through the medium of the shirt. This is a matter of importance as many men attributed a primary or recurrent attack of dysentery or diarrhoea to the pressure of the car-

tridge belt. either before admission or after returning to duty. and the truth of this was so well recognized that many advocated the wearing of the belt across the shoulders, bandolier fashion, to avoid the pressure of the heavy cartridge belt on the abdominal organs.

A light woolen sock should always be worn, the tendency of the cotton sock to expand and wrinkle under moisture—other considerations aside—being well known. An extra pair should invariably be on hand at the end of the march.

Fit, light weight and fine quality should always govern in the matter of leather foot gear; the fallacy of attempting economy in this line has frequently been called to our attention.

I mentioned above the texture and quality of the garments, and I desire to say, that it is a matter of the very first importance that all material should be such as to reduce to the lowest possible minimum its irritating effect upon the skin. The necessity of this to all who are acquainted with tropical conditions is obvious and will be referred to again later on.

To meet the first indication set forth above, viz: to prevent chill at night, the garment or garments would have to be largely, if not wholly of woolen material, but the irritating effect upon the skin of wool as ordinarily woven is well known and hard to overcome. My only objection to the blue flannel shirt as issued (which as before mentioned has rendered staunch service) is that it is entirely too coarse in texture and many men simply cannot stand the itching and erythema that it will produce, and moreover the irritation thus set up is liable to be the forerunner of what all men in the tropics fear—the dreaded dhobie itch. This is an opportune time to call attention to the paramount necessity of conserving in every possible way healthy skin action. The macerating effect on the skin of heat and moisture during the rainy season, not only to the man who is "hiking," but very often to others who are less actively engaged, is one that demands our most serious consideration and next to scrupulous cleanliness the prophylaxis consists largely in supplying the individual with clothing that will not unduly irritate the already sensitive skin. Right here I would like to say a word in regard to the abdominal

band for the purpose of unqualifiedly condemning it, and for the following reasons: If it happens to remain in place it not only interferes with abdominal respiration, but is almost sure to induce prickly heat or other erythematous condition with subsequent skin complications, and if it does not do this it is because it has rolled up into a constricting band under the armpits or over the pelvis, and in any case will very likely be a source of unending discomfort to the wearer. As a matter of fact it belongs to the same pernicious class as the neck muffler and the chest protector and regional protection in the tropics is as unscientific and irrational as it is elsewhere.

Next in order comes the question of headgear, and this is a matter of most serious import. The depressing—I might almost say the paralyzing—effect of the tropical sun is such that only those who have been subjected to its overwhelming rays can fully appreciate—and as the head is called upon to bear the brunt of this it should be most fully and adequately protected. Our heavy felt campaign hat, although generally used by our troops in the tropics, has certainly not met the indication. A proper military hat or helmet might be constructed on the lines of the average native hat which combines lightness of construction, protection for the face and neck—more particularly the latter—and thorough ventilation; the latter being secured not only by permeability of the material used, but more particularly for the reason that the average tropical native never allows his hat to be pressed down over the vertex, but prevents this by a circular crown rim resting lightly on the top of the head. He secures his hat when necessary by a chin strap. The fault of the average helmet is that it fails to consider these important essentials, and is made—irrespective of the material used—to conform to the shape of the head thereby permitting it to be pulled down over the vertex to act as a constricting band and consequently seriously interfering with its value as a head protector.

The general shape of the headgear might be circular or helmet-shaped without detracting in any way from the essentials mentioned, and it might be covered with a porous khaki-colored material to match the uniform.

The dress for permanent camp or garrison is comparatively a simple matter and the ordinary clothing issued by the Government, viz:—white or khaki outer garments, the chambray or blue-flannel shirt and the campaign hat or khaki cap easily meet the indications.

I shall not attempt to enter into the chemistry of tropical dietetics or discuss the subject, other than in a practical way, and consequently my remarks will not be extended.

The first and most important is that life in the tropics has a decided tendency to lower the nutritional standard of the individual from abroad, and this in many instances is largely augmented by the fact that he is deprived to a greater or less extent of his customary aliment.

Not a little has been written in recent years about the necessity of eliminating to a considerable degree the nitrogenous and fatty elements from the tropical dietary and substituting therefor, either wholly or in part the carbo-hydrates, particularly in the matter of fruits and tropical cereals, but after a somewhat extended experience in the tropics I am convinced that this idea is largely erroneous. The individual from the outside, if he is to maintain his health in the tropics, must keep his nutrition up to the highest point, and he actually needs as much, if not more food, and better than he ever required at home.

The Subsistence Department of the Army in supplying the fresh Australian beef and in furnishing the troops generally with the liberal ration allowed, was an important factor in sustaining the large degree of effectiveness maintained in the Army in the Philippines, and the ration as supplied was not in any degree lacking in the nitrogenous and fatty elements.

If I were to epitomize my ideas on this part of the subject (or advance anything in the way of a general rule) I would enjoin the individual going to the tropics to approximate his diet as nearly as consistent to his accustomed fare at home, not excepting a glass of good wine at meals, if the individual is so disposed, drinking only distilled, boiled or carefully filtered water when it is possible to obtain such, avoiding all excesses in eating and drinking, and generally conducting himself as a rational person should in any quarter of the globe.



This all seems very simple, and it is, but as far as my observation has extended, it is all that is required in that line to keep the average individual in a fairly good state of health in the tropics. He may, notwithstanding all this contract amoebic dysentery (which by the way is the one dread disease of the oriental tropics, at least the Philippine part of it) but in most cases he will not, and for the matter of that he might have contracted typhoid fever even had he remained at home, for I believe, notwithstanding all our efforts that Eberth's bacillus is still with us, and effects a lodgement on suitable soil with rather astonishing frequency.

The tropical diseases that concern us as military surgeons are perhaps in the order of their frequency and importance, dysentery, both amoebic and specific, malarial fever, yellow fever, dengue, beri-beri, cholera and bubonic plague. Sprue or psilosis I have not mentioned, for the reason that I fully agree with Contract Surgeon Musgrave, U.S. Army, in his recent valuable and exhaustive article on the subject, believing it to be a condition liable to be engrafted on any depressing disease incident to the tropics, and not a distinct morbid entity; neither have I mentioned diarrhoea for almost without exception in the cases sent from the interior to the large hospitals with a diagnosis of diarrhoea, a history of catarrhal dysentery could be elicited and not infrequently a microscopical examination of the stools, or an application of the agglutination test, proved the cases to be amoebic or specific dysentery.

The prophylaxis of dysentery as heretofore set forth, consists largely in paying the most scrupulous attention to the food and drink of the soldier, and measures directed toward the maintenance of his health at the highest possible standard.

The prophylaxis of malarial fever is so well known that I will not take up your time with it, for preventive measures in the tropics are the same as those found essential elsewhere. The non-effectiveness due to malaria among troops serving in the tropics has always been large and although the lines along which it should be combated are now well known, the intelligence and thoroughness with which the work is carried out will depend very largely on the military surgeon.

Yellow fever I have had little personal acquaintance with, but fortunately the unprecedented work of our confreres in Cuba has placed in our hands means by which this once terror-spreading disease may be effectually held in check if not actually stamped out.

Dengue in the Philippines was a common and wide spread affection and did not differ in any essential particular from the disease as found in our southern states, the epidemic as a rule continuing until all susceptible material was exhausted. The mortality was nil.

Beri-beri in its various forms was occasionally met with, but as this is undoubtedly a disease of locality, the propagation of which is fostered by heat, moisture, filth and overcrowding, the chances of our troops ever being seriously affected by it are rather remote. The hygienic measures necessary in case an outbreak does arise are perfectly plain.

Bubonic plague need not be a source of alarm to civilized troops serving in the tropics. Not an American soldier contracted the disease during my tour of duty in the Philippine Islands, covering a period of two years, although the disease was prevalent for a great part of that time in Manila and elsewhere on the islands. The work done by medical officers of the army in the organization and conduct of the various Boards of Health was largely responsible for this, and their work is deserving of the highest praise.

Cholera I have had no personal experience with, but from letters received from Manila, the recent outbreak of that disease in the Philippines has so far been entirely confined to the natives and the Chinese, and the disease in this respect bids fair to act in the same manner as the bubonic plague.

In conclusion I desire to say that with the knowledge we have gained of tropical conditions, and the disposition on the part of all concerned to further all necessary hygienic and sanitary measures, I believe that with due care and perseverance on our part the health of our troops in the tropics will never seriously suffer.

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## Editorial Department.

### AN AUSTRO-HUNGARIAN VIEW OF THE MEDICAL ORGANIZATION OF THE UNITED STATES ARMY IN ACTIVE SERVICE.

**T**HE question of the most suitable medical organization of the United States Army in active service has recently come again into greater prominence, and it is one of great interest also for the non-American medical officer.

While keeping in view the excellent articles of Lieutenant-Colonel Valery Havard, Captain Frederick P. Reynolds, Captain John Stewart Kulp and others published in this journal, may a foreigner be permitted from a general point of view humbly to express his opinions, despite the fact that of course many particulars regarding conditions in the American army are unknown to him?

Among the best features of the American military medical organization are the military rank, there granted to the army doctor, and the military authority with which he is invested, as well as the equipment of the military hospitals, which is much better than that of other armies.

In regard to the first matter the United States Army has long been a pattern for most of the military medical staffs of the Old World, and to this day only the army doctors of the Swiss, Norwegian, Italian and English armies in regard to their military authority are equal to those of the American army, which finds expression also in their military titles. In the other armies of the Old World the medical officer is still more or less limited in his military authority. Effective service of the medical apparatus can only be obtained when the specialist, and that the army doctor is, is absolute master in his own house.

Therefore Lieutenant Colonel Havard is quite right when he says "The best results will be obtained by granting it complete autonomy, including the full control of its personal and material."

However advisable it may be for the military doctors to be commanders of the medical formations and independent managers of the entire medical service in the army, yet one must admit that for the management of the pharmaceutical, administrative, pay and transport departments special officials should be appointed. But if any high degree of intelligence is required of them they must be officers, or military officials, namely apothecaries, administrative and pay-office officials, transport officers etc. In most armies the commanders of the combatant troops have laid upon them duties connected with the administration, paying, commissariat, etc.

In Austria are found both in peace and war, besides the doctors also pay departmental officers, apothecaries,—administrative officers attached to the medical department; in Germany there are apothecaries and administrative officials; in France apothecaries, administrative and transport-officers; in England quartermasters, etc.

By means of such officials the army doctors are at least partially relieved of administrative duties, and can consequently better devote themselves to higher duties, commanding and medical matters respectively; but it is a *sine qua non* that all these assistants should in every respect be under the command of the *doctor* on duty.

In the American army medical organization this arrangement is wanting, and all the administrative business as far as it is not carried out by the non-commissioned officers of the hospital corps falls to the share of the doctors. Captain Kulp is of opinion that this division of labor in the administrative service is "certainly in the direction of increased efficiency;" and Lieutenant Colonel Havard demands two line officers for each division as acting assistant quartermasters and commissaries for the ambulance and the field hospital.

The fact that hitherto both in peace and in war the Ameri-

can army doctors performed the whole administrative service of the medical organization to the complete satisfaction of those concerned, is only a proof of the practical talents of those doctors, and it is fully acknowledged abroad.

The institution of *dental surgeons* is to be hailed with joy. In Europe it has been introduced into but very few armies; but Germany attached a dentist (with the rank of a military official) to her Asiatic expeditionary corps. In Austria-Hungary the training of military dentists has for some years had particular attention paid to it, but at present there are no army dentists here.

*Female nurses* are not so extensively employed in any European army, except the English one, as they are in the American. Quite recently in Austria-Hungary in some large garrison hospitals sisters of mercy have been engaged as nurses for the seriously ill. In the field there is no prospect of their being engaged, nor is it their place, despite the distinguished services rendered there by some few of them. One cannot but share Captain Kulp's opinion that for the field only the "well instructed sanitary soldier" is suited, although that without doubt female nurses can do good service in the base hospitals.

The staff of the *hospital corps* should be subject to strict discipline and maintain a true military spirit. The latter should be kept up by the recollection of the glorious deeds performed in war by single divisions or members of the corps. The sanitary soldier ought to have the same military rights as the other troops. In Austria-Hungary the noncommissioned officers of the sanitary corps have the same titles as other noncommissioned officers, and in America it would be better to give them such titles instead of the present "hospital steward," and "acting hospital steward," namely "sergeant" and "corporal."

One of the most important duties is training the hospital corps for war continually. Peace service must not wholly absorb the corps any more than the other troops. In this respect circumstances are unfavorable in most European armies. For economy's sake the sanitary corps is kept small in times of peace, and the constant hard service in the hospitals prevents training for the field.

We entirely agree with Lieutenant Colonel Havard when he demands a homogenous hospital corps, and when he declares the German system of "acting regimental litter bearers" one not to be followed. In Austria-Hungary besides the sanitary corps, which does the work in the sanitary establishments, in most branches of the army there are "regimental litter bearers," who, unlike the German acting regimental litter bearers, are not provided with rifles, but only with a sanitary equipment, and consequently are destined *exclusively* for sanitary service behind the front, and at the "dressing stations." Besides these bearers there are in the Austrian-Hungarian army also "sanitary assistants" (who are more highly trained noncommissioned officers) and orderlies, at the disposal of the army doctors.

The members of the hospital corps ought to be armed, and they are so in all European armies, with at least side arms. This firstly increases the men's self-esteem, and then in the vicissitudes of war he may need a weapon to defend himself, or those entrusted to his care, e. g. from the hyenas of the battlefield, or against uncivilized peoples, of which there still are some in Europe (e. g. the Albanians).

As for the sanitary service during a battle, we share the opinion of Lieutenant Colonel Havard, namely that the ambulance station, as the Americans call it (the dressing station of the English, ambulance of the French, Hauptverbandplatz of the Germans) will in future mostly be superfluous. In consequence of the small calibre bullets the dressing stations during the action, or at least when one's own side advances, or in pauses in the fighting, will come into activity. It is hardly possible for the ambulance station to be set up only after the fighting; it must take place at a time, when the field hospitals (which for military reasons will remain at a considerable distance in the rear) have not yet arrived. But Lieutenant Colonel Havard is right when he says that it will not be necessary to fit up the ambulance like field hospitals, if these later will soon take the place of the former.

In order to adapt the first aid to the wounded, during an engagement, to the military situation, but on the other hand not to scatter the medical assistance too much, it is intended in the Aus-



tro-Hungarian army to assign the dressing stations according to the *fighting groups*, and not according to the usual fixed troops.

In all wars it has been found that the slightly wounded who have already had their wounds dressed are a disturbing and disquieting element at the ambulance stations. Therefore it is proposed in Austria-Hungary to establish special "stations for the slightly wounded," which should be placed about as far forward as the dressing stations, or a little farther back, in an easily enclosed place, a farmyard for example; and such wounded men as could walk should be sent direct from the dressing stations, in charge of a slightly wounded officer, or noncommissioned officer. The severely wounded would be transported from the ambulance stations to the field hospitals, whereas the slightly wounded as a matter of principle, should be sent to the hospitals for slight cases of illness and light wounds, in order after their restoration to return to their troops.

Such stations for the slightly wounded (German: *Leichtverwundeten-Stationen*, French: *dépôts d'éclopés*) we miss in the organization of the American army, and yet they certainly would be very useful for relieving the hospitals.

One cannot but agree with the figures given by Lieutenant Colonel Havard respecting losses on the field of battle. It may interest the reader to learn what percentage is reckoned on in the Austrian-Hungarian army in the "Kriegsspiel." On the basis of the most recent experiences in war 10% is taken to be the normal loss in a bloody engagement, while 15% is considered an exception; of the total loss 20% is calculated as meeting with instant death, 20% severely wounded and untransportable, 15% able to march, 20% to be transported lying and 25% sitting.

The regulations laid down by Lieutenant Colonel Havard for the sanitary service during a fight are excellent, and adapted to the modern manner of fighting. We understand why the Americans send one doctor to accompany each regiment into battle. In some European armies recently there has been an inclination to abandon that practice. Just at the present time, when dressing stations cannot begin their work so soon as in former

wars, it is absolutely necessary to have doctors with the troops to save lives, to superintend the litter bearers, and for moral reasons. Of course these doctors sent forward must, like the fighters, make use of all shelter afforded by the ground, in order not needlessly to expose themselves. The loss of some doctors in engagements is inevitable.

The Spanish-American War and the South-African War have furnished numerous examples of courage and self-sacrifice on the part of army doctors; the names of these victims will be honored by the members of the sanitary corps of all armies, and will remain unforgotten as shining examples for coming military medical generations.

Great wars are always the occasion for improvements in the military sanitary service. For the United States this was again proved by the war with Spain. The reorganization of February, 1901 certainly removed some defects brought to light by the war of 1898. The great achievements of the United States army medical department under the prudent and energetic management of its former head, Surgeon General George M. Sternberg, who deserved so well of it, is sure of recognition on the part of the sanitary officers of all foreign armies.

JOHANN STEINER, *k. und k. Regimentsarzt* (Vienna).

#### AN ADEQUATE PENSION FOR THE WIDOW OF THE LATE MAJOR WALTER REED.

**A**MONG the greatest losses suffered by the Association during its history is that occasioned by the death of the late Major Walter Reed of the Army. The loss to the Association however was no greater than the loss to the world. One of those rare natures to whom came the opportunity to contribute largely to the welfare of the race, Major Reed's name is written in letters of light upon the roll of Humanity's benefactors. His services to mankind and in particular to our own country were so great as not to be recited in ordinary phraseology. We are wont to glorify our country for its altruistic act in accomplishing the freedom of Cuba. What a nation did for Cuba politically, Walter

Reed did for her hygienically. Even more, by control of the pest which constantly devastated Cuba, he removed the constant menace of an epidemic from our own shores. In terms of cold cash his services were incalculable. In terms of health and suffering the results of his work were even more inexpressible. It is then but a modest request which is being made of Congress to grant a pension of \$4 000 a year to the widow of one who deserves so much at the hands of his country, and favorable action should be promptly taken.

### ON SOLDIERS' FEET.

REFERRING to the critique on the work of Capt. H. Bryn of the Norwegian army, published in the JOURNAL of October last, the figures as to length and breadth of feet seem to be fully dealt with, but there does not appear to be sufficient attention paid to the fact that there are two broad classes of feet, characterized by the relative length of the great toe.

In one class the great toe is the longest, causing a shape of foot in which the inner border is fairly straight, and the fifth toe has a tendency to under-ride—in fact in many cases it shows a marked tendency towards future elimination.



In another class the second toe is the longest, causing a roundness of the front of the foot. This is the foot of the classical statues; but the practical view of it is that its possessor requires a properly rounded end to his boot.



In the former case a square-toed boot means waste of leather on the outer side.

These broad classes do not appear to receive that recognition by bootmakers which is especially desirable in the manufacture of ready-made boots, such as it is necessary to keep in stock for the shoeing of an army.

B. SKINNER,

London, England, Dec. 2, '02.

Lt. Col. R.A.M.C.

## Reviews of Books.

### MILITARY AND NAVAL SURGERY IN THE INTERNATIONAL TEXTBOOK OF SURGERY.\*

THE second edition of the International Textbook of Surgery presents constant evidences of revision, by which all the advances in surgical theory and practice have been incorporated into its text. The comprehensive chapters on the various branches of surgery, written by accomplished surgeons of Great Britain and the United States, might all be considered with much advantage, but the present review is necessarily concerned with the divisions relating to military and naval surgery,—the former by Surgeon General Forwood, the latter by the late Medical Inspector Siegfried and revised by Surgeon Henry G. Beyer.

General Forwood has made many changes in the practical portion of his article, as would be expected in view of the experiences of recent hostilities in various countries. The space devoted to deformity of the bullet in the revised article is largely increased, and illustrated by a new plate showing various degrees and types of deformation. The section on wounds of the head has been re-written and illustrated by a new cut. An extensive addition has been made to the discussion of wounds of the chest and the account of gunshot wounds of the abdomen has also been materially expanded. The comment upon wounds by the old army revolver has been dropped as obsolete.

The treatment of military sanitary organization has been modified much less than that upon gunshot wounds. The new

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\*The International Textbook of Surgery by American and British Authors. Edited by J. COLLINS WARREN, M.D., LL.D. and A. PEARCE GOULD, M.S., F. R.C.S. *Second Edition*. 2 volumes; Roy. 8vo; pp. 965, 1122; 960 illustrations and 17 full page plates in colors. Philadelphia and London, W. B. Saunders & Co., 1902.

nomenclature, "medical and surgical chests," has been substituted for the expression, "medicine-panniers," and a few other minor changes calculated to more effectively round out this admirable article have been made.

The section on Naval Surgery has been subjected to much greater change than that on military surgery. It is in effect an entirely new article, presenting of course many of the points and illustrations employed in its predecessor, but in many cases, treating them independently and with individuality. The introduction is entirely new and consists of a valuable statistical discussion of the diseases and injuries prevalent in the naval service accompanied by exhaustive mortality tables. Transportation of the wounded on shipboard is carefully considered. The ambulance sleigh of Kirker is fully described but the Ames Board has evidently been overlooked; and the article closes with an account of the work of the hospital ship Bay State based upon the report of the medical work of the Massachusetts Volunteer Aid Association during the Spanish war.

These articles set for the International Textbook a high standard, which so far as we have been able to judge has been amply maintained throughout the work.

#### OCHSNER'S CLINICAL SURGERY.\*

**T**HIS book is written on original lines and illustrates the up to date surgery of the author. It is authoritative and bears the imprint of individuality. Among the many good things that will bear frequent reading, are the boiled down facts grouped under the heading of "General Surgical Considerations." They are concise, almost epigrammatic, and deserve close study from the reader.

The article on hernia is graphic and the various steps in the different varieties of hernia are clearly illustrated by the numerous plates.

The operations employed in abdominal surgery are well illustrated by plates and in the text. The author's results in the treatment of advanced cases of appendicitis by his method seem

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\**Clinical Surgery for the Instruction of Practitioners and Students of Surgery.* By A. J. OCHSNER, B.S., F.R.M.S., M.D. Roy. 8vo; pp 481; 100 illustrations: Chicago Cleveland Press, 1902.

phenomenal and almost incredible; with others, the treatment, with the exception of stopping the nausea and vomiting and relieving the distention, has been unsuccessful. How it can limit gangrene of the appendix, prevent the formation of pus or the spread of peritoneal inflammation is not described. In the claims of a reduction of mortality it is unfortunate that the author has not fully explained the means by which this treatment relieves the above condition. It is greatly to be feared that owing to this teaching, others will not have the same good results, and that the benefits from early and prompt operation will be neglected.

The illustrations are new and original. The clear text, wide margins and high quality of the paper add greatly to the value and appearance of the book.

The work is essentially clinical in character and represents modern surgery and advanced technique, presented with force and conviction by one of the leading surgeons of the day.—A. R. ALLEN.

#### SCUDDER'S TREATMENT OF FRACTURES.\*

THE demand for a third edition of this work, following so soon after the second edition, is the highest testimony the profession can give as to its value. The writer had the pleasure of reviewing the second edition in a previous number of the JOURNAL, and felt at that time that little could be added to enhance the value of the book to the profession. The author, nevertheless, has taken advantage of all the latest literature, and has carefully revised and enlarged the book, drawing on the experience of Mr. Makins in South Africa and other surgeons in the field during the recent wars and recorded the results in the new chapter on gunshot wounds of the long bones.

The uses of plaster of Paris as a splint material have been more fully illustrated and descriptions of several new fractures have been added, thus bringing the volume up to date in every way.

A. R. ALLEN.

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\**The Treatment of Fractures.* By CHAS. L. SCUDDER, M. D., Assistant in Clinical and Operative Surgery, Harvard Medical School. *Third Edition, revised and enlarged* Octavo, 480 pages, with 645 original illustrations. Philadelphia and London: W. B. Saunders & Co., 1902.

THE LAWS OF PHYSICS AND BALLISTICS THE TRUE  
EXPLANATION OF THE LODGMENT AND DE-  
FLECTION OF THE MAJORITY OF MODERN  
SMALL-ARM PROJECTILES, NOT THE  
RICOCHET HYPOTHESIS

By MAJOR CHARLES BEYLARD NANCREDE,

ANN ARBOR, MICH.

CHIEF SURGEON OF UNITED STATES VOLUNTEERS; PROFESSOR OF  
SURGERY IN THE UNIVERSITY OF MICHIGAN AND  
DARTMOUTH MEDICAL COLLEGE.

**I**F we believe in the truth of the much quoted, but seldom followed opinion of Delorme, it is requisite for the military surgeon to know the "calibre of the arms, the weight of their projectiles, their diameters," their "initial velocities" and their "remaining velocities" . . . . . "at the different distances" to appreciate the "characters" . . . . . "of the wounds he will have to treat." Hence, although according to the same author, "the laws of Ballistics are a difficult and thankless study, a knowledge of them is of inestimable value to the army surgeon."

While all the dry data I shall mention may be known to my audience, the proper marshalling of the facts will enable me to mass them in such overwhelming force as to require the expenditure of only a few words in argument.

My reasons for this paper are two-fold, the chief one being the too common assumption that because a modern military small-arm projectile has lodged or is deflected, this is the result of ricochet. My minor one is, that this occasion will enable me to call attention to, and correct an error in a former paper read before the American Surgical Association at its Chicago meeting, where the mathematician who made the computations failed to indicate foot *poundals* instead of foot *pounds* in the final result.

The reduction of foot poundals into foot pounds in no way alters the facts or conclusions of that paper, but merely renders the actual amount of "energy" more comprehensible.

The first point which I beg you to bear in mind throughout the whole of this paper and any discussion which may follow, is the physical configuration of the modern projectiles and that of their trajectory. A modern projectile is not a ball, but a bolt projected endwise, whose inevitable tendency, unless counteracted, is to revolve around its shorter axis. At every portion of its flight this tendency exists if the force which prevents it from rotating around its shorter axis is partially or totally suspended. The force which maintains the bullet in its flight endwise is the rotation around its long axis imparted by the rifling, and the speed of this rotation steadily diminishes from atmospheric resistance as the distance from the muzzle of the weapon increases. The high sectional density requisite to overcome air resistance is secured by the small area of the cross section of the bullet as compared with its weight. This necessary weight with small sectional area can only be secured by a long bolt of lead, but to insure sufficient rapidity of revolution to overcome the certainty of revolution around the shorter axis one turn in about twelve inches is given to the rifling. This necessitates shallow rifling and a hard mantle for the projectile, otherwise the bolt would strip, "leading" the grooves and reducing the weapon to a smooth bore one. This increased number of complete turns in a given length of barrel demands a powder leaving little residue, for with black powder the shallow grooves would soon become fouled sufficiently to prevent the ball acquiring the proper "twist;" yet smokeless powder does leave some residue, and the shallow grooves wear in certain instances sufficiently, so that in combination with such fouling as the smokeless powder produces the balls do not "take the grooves" properly, hence do not revolve with sufficient rapidity to overcome their tendency to rotate around their shorter axes. It is hardly necessary to point out that this diminution of rapidity of revolution if marked must determine deflection if slight resistance is met with, indeed the entrance of the ball sideways or "butt" foremost has been observed in some instances, without having en-



countered any obstacle in its flight to lessen its force or direction of impact; in other words these deflections need not be due to ricochet.

It cannot be said that this is a theory incapable of proof outside the laboratory or study, because bullets have been extracted showing plainly marks of such imperfect or almost missing rifling as demonstrated imperfect revolution, and thus accounted for their deflection or lodgment, or for both.

From the instant the projectile leaves the muzzle, gravity is drawing it towards the ground, which it must reach at the same time, whether the bullet moves rapidly or slowly, but in the former case it will have traversed a much greater distance in space than under the latter condition: in other words, in both instances it will describe a parabola of greater or lesser curvature, and the bolt-like projectile always strikes an object at an angle, which mode of impact still further favors the tendency to turn around the shorter axis.

Again, such a bolt-like missile striking even a vertical plane at a slight angle, as it must always do, would tend to be deflected, pursuing a course approximating the line of the resultant of the two forces. Although this influence might be only slightly operative as compared with the force exercised in producing the onward flight of the projectile, it distinctly favors the deflection of any missile which by having one axis shorter than any other possesses an inherent tendency to rotate around this axis.

Only a few more data require statement, when their applications to sustain my contentions will require only a few sentences. Would any one feel surprise or express doubt that at 1000 or 1500 yards range the Springfield bullet should be deflected if it met with resistance, or that it would lodge under similar circumstances, although its form does not readily lend itself to these accidents? Yet the actual "remaining energy" of Krag or Mauser projectiles at such ranges is only one-sixth to one-ninth their "initial energy," and actually much less than the Springfield possesses at the same ranges. A brief review of the following tables will give a clearer idea of how much less powerful modern weapons are at the ranges where a large number of wounds are

inflicted, viz: 1000-1500 yards. At the former range, although the "remaining velocities" do not differ much, it must be remembered that the "remaining energy" only equals one-half the "remaining velocity" squared, multiplied by the mass of the ball, and that this, the mass of the modern projectile, is less than half of the Springfield and other old fashioned balls.

	SPRINGFIELD	MAUSER	KRAG
Muzzle velocity	1300 ft. S.	2285 ft. S.	2000 ft. S.
Velocity at 300 yards	930 "	1660 "	1390 "
" 600 "	830 "	1210 "	1020 "
" 1000 "	680 "	920 "	800 "
" 1500 "	520 "	730 "	620 "
Muzzle energy "	1876.02 " pds.	2504.44 " pds.	1952.73 " pds.
Energy at 300 "	1066.11 " "	1469.48 " "	943.22 " "
" 600 "	746.73 " "	780.76 " "	507.90 " "
" 1000 "	513.29 " "	451.35 " "	312.43 " "
" 1500 "	300.16 " "	284.18 " "	187.65 " "

A long bolt-like projectile, when its "remaining velocity" and "remaining rotation" is greatly diminished, as both are at the distances at which very many wounds are received, is more apt to enter obliquely—possibly "butt" foremost and to be deflected if it strikes oblique planes of bones, tense fascias or tendons, than the old projectiles.

When the long axis of a projectile which has lodged lies at a distinct angle with that of the track of entrance, it has been too readily assumed that it must have had its course altered and its speed retarded by single or repeated contact with extraneous objects during its flight, i. e., has ricocheted. If however such missiles entered in the direction their position of lodgment would indicate the skin opening would be of a corresponding form, while if they had their course changed after entrance, the skin wounds would be round and of about the same calibre as that of the projectile, or at most, be slightly oval in outline, if the missile struck somewhat obliquely. This is the rule for numerous such wounds that I have seen where bullets were lodged in peculiar relation to the wound of entrance, or where their track was a devious i. e., a diverted one—while the skin wounds indicating ricochet balls were of a different form and were of rare occurrence.

Even when a bullet does enter exactly sideways making a key-hole opening, as I have seen more than once, there is no certainty that this was due to ricochet, because the ball at the time of impact might have been either revolving around its shorter axis because the "spin" of the ball was nearly spent, or this latter force being weakened and the ball striking obliquely this combination of influences determined the lateral passage of the projectile.

I do not contend that ricochet shot wounds never occur, but that the ricochet theory need not be invoked when demonstrable physical laws are fully adequate to explain the conditions, and when the ball has been deflected by striking objects during its flight it usually shows by the form of the entrance wound that it has entered sideways and that this *may* therefore be due to ricochet. Again, its altered form, no bone having been encountered during its passage through the soft tissues, may prove that its lodgment was probably due to having had its flight artificially retarded. Under such circumstances the wound of entrance would probably show some peculiarity suggestive of a glancing ball. Even after a ball has been influenced by ricochet, further deflection of its course after contact with the tissues is in most instances merely due to the influence of the forces already described as operative upon a missile whose onward flight and rapidity of revolution has been materially lessened by the distance it has traversed in space.

Finally, while the ricochet theory does account for the irregular entrance of some missiles, and because their "energy" is thus lessened by contact with extraneous objects, this theory may sometimes account for lodgment and deflection, in the majority of instances this is not the correct explanation, and at the ranges where a large number of missiles strike many cases of lodgment and deflection are to be expected and accounted for on demonstrable scientific principles.

## THE MILITARY MOTOR AMBULANCE.

By LIEUTENANT CLYDE SINCLAIR FORD,

MEDICAL DEPARTMENT, UNITED STATES ARMY.

**I**T IS only within the past few years that real and considerable progress has been made in the motor vehicle. Although at various times during the past twenty years practical machines have been produced, and cumbersome attempts were made a century ago, it has remained until the past decade for the public to become sufficiently interested and to possess enough confidence in the future of the self propelling road machine to extend the financial support so necessary to attract the best inventive and constructive genius essential to any mechanical advance.

It is not less than marvelous to see, within these past few years, what improvements in design, detail, utilization of new material have been made in the application of elements of power that have for years been widely enough known to have been almost within the inclusion of "general information."

And as creditable as the motor car of today is to the mechanical and inventive genius of its creators, it is quite probable that it will compare but little more favorably with its successors of a few years hence than Stephenson's early effort compares with the mile-a-minute-schedule-time locomotive of the modern railroad.

The most sanguine advocate of the automobile would hardly see, even in the farthest future, an age that would be entirely horseless, yet this new mechanical factor in transportation, in its destined perfection, will not only relieve the traction animals of much of their burden but it will take up new ones of its own.

It is to be expected that no little unfavorable criticism, contention and some absolute condemnation would be occasioned by the advent of an innovation so comprehensive and positive as the

motor car and, too, that the recreative phases of this movement should be more in evidence in the beginning, than the utilitarian features. The newspaper-reading public, is apt to be best informed upon the adverse criticism emanating from more or less sensational sources rather than to have a technical knowledge which can only follow an interested study of the subject. That destroying monster which now whirls madly through the land in the hideous shape of a "Red Devil" or a "White Ghost," will soon become as commonplace and as undisturbing a feature of our streets and highways as the trolley car, which but a few years ago, just after driving the tired and jogging street car horse to his long earned rest, was known only as a "juggernaut."

In the development of new sources of power and improvement of the old and well known elements of locomotion on the common road, there is involved an investment of capital, a business and commercial interest, and an engagement of inventive and constructive genius, the magnitude of which, for the few years since it has begun, has hardly been equaled in the introduction of any other invention.

In France, alone, 200,000 persons are exclusively engaged in the manufacture of motor vehicles.

In military operations, however small or large the body engaged—whether a company or a corps—and whatever be the organization, the problem of transportation constitutes so much of the situation that any new element in this important department should receive the closest and earliest attention from military authorities.

The armies of Europe have been investigating this subject for several years. Careful tests have shown, beyond doubt, that motor transportation is applicable, in at least a restricted way, to almost every branch of military service.

The field of usefulness is being extended and only the continuation of trials will determine its limits.

Two years ago the German Emperor offered a prize of \$20,000.00 for the best automobile for general military use and about a year ago the British War Office offered a prize for the production of a motor car for military purposes.

In a report of Capt. R. S. Walker R.E. there is given a great variety of uses to which an ordinary steam-runabout was put to on the South African veldts.

The French army during the past few years has employed the motor wagon for many purposes. During the maneuvers of 1898, it was used by couriers and officers making inspections, and with a great saving of time. Commissary and artillery supplies were transported. An eight-seated twelve-horse-power vehicle with a speed of 22 miles an hour was used by staff officers. Besides a postal car, there was a surgeon's wagon fitted up as a sort of field hospital.

In the United States army the Signal Corps has had an electric vehicle in Manila for some time past and this enterprising branch of the service has also operated both the steam and gasoline machines.

The other investigations in our army have been confined to two or three hazardous but unsuccessful attempts of a few officers to ride in the steam wagons of one maker through from New York to Washington.

But this comparatively slight interest of the United States army in motor vehicles seems only apparent to a hopeful patriot who, in commenting on the subject, assures us: "It must not be supposed, however, that because the United States has been somewhat backward in including the new vehicles in its military outfit, there is any lack of interest here in the experiments of other countries."

Although the entire subject of army transportation need not be the concern of the Medical Department, the direct and responsible interest of the medical officer in the transportation of the sick and wounded must be quite apparent, and a consideration of the possibilities that lie in a military motor ambulance can not but be entirely within the province of this body of military surgeons.

There are many reasons and much evidence leading to the conclusion that this device is of great and increasing importance to the medical service of the United States army. And, whatever may be the importance when adapted to the general military ser-

vice, its use as an ambulance will have more advantages and fewer disadvantages than in any other place in the army.

To whatever extent this new machine may be perfected, it will not be argued that it will ever supplant entirely the present hospital transportation.

Any vehicle that is propelled by a power that directly turns its wheels must have a road-way that is more of a plane, horizontal and resisting surface than that required by a vehicle drawn by animals. A motor ambulance can never be made that can follow the present service ambulance through the worst conditions of mire and rut, but the particular and special uses to which this machine is adapted in military operations must make it a necessary part of an army's equipment.

A considerable portion of an army's ambulances are used about the base of operations and in communication between the base and advanced lines, for the transportation of the disabled is always towards and at the base. There, roads must already exist or they must be built and the motor ambulance can always be used, even though it might not follow pack mules or a mountain battery. Yet, the radius of this machine would not be limited by the conditions of the highway that prevent the turning of its wheels. It is the bad places in the road that stop the vehicle so, with a force of twenty horse-power or more stored in its vitals and connected with a capstan carrying a wire rope warp of appropriate length, a motor wagon would not only be able to get over or through many places impassable to teams but it might be the means of pulling an entire wagon train through besides.

The transportability of the motor ambulance commends it at once to military use, because of the facility and economy with which it can be shipped either by rail or by sea to the point of mobilization of troops.

There can be no doubt of the immense saving of time and money in supplying an army across the sea with ambulances containing their own power instead of accompanying each of them with a mule team. Besides there is not the unending labor of subsequently keeping up the forwarding of great bulk and considerable weight of forage necessary for animals. The transportation of fuel for a motor is a much less laborious task.

Of all the principles entering into the organization of an army the one of preparedness is, above and beyond all others, the most important. A machine of this kind can be kept in readiness without any deterioration or expense in maintenance and it can be sent off to a mobilizing point without the least preparation—already trained down to service conditions.

Not the least reason for the adoption of this vehicle is the readiness with which it lends itself to become the property of the Medical Department, so that it may be entirely controlled by those most directly associated with it and interested in it, without the roundabout and often unsatisfactory method of having it provided and owned by another department.

In presenting any new device as a substitute for an old and tried one, the question of actual and comparative cost must be considered together with its efficiency. To sum up the invoice price of the various articles included in a four mule ambulance outfit, the amount would certainly be much less than the first cost of a motor ambulance that could be built today, and even the ultimate development of the latter is not likely to cheapen it to the cost of a mule-drawn vehicle. But the relative economy of these two devices can not be determined by a comparison of first cost so that any figures giving this relation may be passed by.

Nor can the relative cost be determined until both vehicles are used for a length of time in the military service and then only after being kept in a state of readiness and afterwards placed upon the ground from which they are to take their places in a military campaign.

A short time since a statement was made by the Quartermaster Department that the mules shipped to Manila were set down at their destination at a cost to the Government of about \$500.00, each. This great cost was due to the heavy casualties at sea. After an animal is unloaded at a distant base, even at such a great cost as in the instance cited, its value is still further enhanced by its liability to diseases that are incident to the climate, and if the service be tropical, by the fewer hours work and slighter effort expected.\*

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\*The recent heavy losses of public animals in the Philippines through infectious diseases emphasize the argument.



It holds too, even under temperate climate conditions, though much more in lower latitudes, that the slight endurance of animal power compared with mechanical power would be such as to give the latter two or three times the capacity of the former.

Only a few weeks ago an ordinary automobile under ordinary road conditions over the country highways of Indiana and Ohio made a straight-away run of 240 miles in 10 hours.

Then, there is that very important factor in the maintenance of motor vehicles that calls for expenditure of fuel only while the wheels are actually turning, while the cost of feeding and caring for animals whether used or not used remains the same.

In the selection of a suitable power it will be necessary to examine the three motors,—electric, internal-combustion and steam—that have been brought to the greatest state of perfection and are to be found in most general use. And, in this examination it must be borne in mind that all the peculiar and exacting conditions of military service must be considered.

THE ELECTRIC MOTOR with whatever advantages it may possess for civil uses may be dismissed without further consideration, because of, first, its necessary relation with a stationary source of power and consequent limited radius of travel; second, excessive weight and short life of batteries in proportion to load carried.

THE INTERNAL-COMBUSTION MOTOR which derives its power from the explosive force of a hydro-carbon—usually gasoline—although it is the most economical in the consumption of fuel, has the disadvantage of, first, great vibration; second, complexity of not only the motor itself, but of speed changing and reversing gear; third, great number and special construction of parts; fourth, necessity for special skill and knowledge in making repairs. As the power of this motor is generated by the violence of successive explosions of a mixture of definite proportions of air and gasoline that must be exactly timed the slightest derangement physical or chemical stops the whole process. But the completely disqualifying objection to this motor for military service is the fuel. Under military conditions it would be more difficult and dangerous to handle than powder, for besides its liability to explode it flows and spreads its flame when ignited.

STEAM furnishes the best power because of first, absence of vibration when standing or running; second, ease and pliability of control at all speeds, forward or backward and under all road conditions; third, light weight and direct transmission; fourth, easy obtainability of fuel and water; fifth, greatest degree torque or the ability to develop greatly increased power for short intervals necessary to pull out of holes or up especially steep grades; sixth, the general distribution of the knowledge and practical training required for operation and care; seventh, the few number of parts and their ordinary construction, making repairs, after considerable destruction, almost always possible; eighth, the absolute reliability of operation, even when parts are somewhat out of adjustment and considerably out of repair.

Fornier, the well known French automobilist declares for the hydro-carbon motor while Edison promises more for the electric motor with his new storage batteries, but objections offered by military conditions are not thus overcome.

In the selection of a motive power for military use the subject of fuel demands careful consideration both with respect to its obtainability in the market during peace and in time of war.

The Germans have appreciated this subject and their war department has offered premiums for the invention of a motor that will burn alcohol for fuel, because the supply of kerosene and gasoline, which is imported into Germany, might be interrupted, by a continental war while they can produce their own alcohol.

With steam as a power, we have to select either gasoline, kerosene, or even a lower oil as a fuel.

Gasoline has properties that make it a most desirable fuel because of its cleanliness and low boiling point. Vaporizing at a temperature less than that of boiling water, it is most easy to control and adaptable to the irregular and sudden demands made on the power. But it is a by-product in the refining process of petroleum and its supply is limited, besides being quite easily subjected to the sharp practices of market control and variation in price, and it is not so widely distributed or generally used as kerosene. A practical kerosene burner, however, has been produced and the general distribution of this oil in the military service, and the other uses

found for it makes it a fuel at once easily and cheaply obtainable. It is safe to handle and transport, contains more heat units than gasoline and has no qualities that make it objectionable to the conditions of military service.

An American manufacturer of steam vehicles believes that he will soon sell his kerosene burning steamers in Paris in economical competition with the French gasoline vehicles.

The type of the motor ambulance should embody some general features which may be briefly specified.

**BODY**, to be mounted on a chassis and to conform with the specifications of the Quartermaster Department for the United States Army Ambulance, pattern 1901.

**CHASSIS** to extend the length and breadth of the body and to securely support all the motor elements: to carry firmly attached in front a horizontal drum wound with 50 feet of wire rope to be used as a capstan and warp.

The engine to be geared to counter-shaft so that the capstan can be turned without moving the wheels.

**WEIGHT**, 2500 to 3000 pounds, equipped.

**LOAD**, 1600 pounds.

**MOTOR**, steam.

1. *Engine*, compound, and if weight be not too great, condensing, 15 horse-power, location in horizontal line beneath floor behind boiler.
2. *Boiler*, flash type or water-tube as the efficiency of either form is unquestioned and neither is liable to be burned. Location, beneath the seat in front of the litter space.
3. *Burner and Fuel*, Kerosene
4. *Exhaust*, through the roof.
5. *Gear*, to include a counter shaft extending across the body with driving sprockets on each end to carry a chain belt to sprockets on the hubs of the gear wheels. This counter shaft to bear the differential gear, a speed reducing gear, a gear to actuate the capstan on the front of the chassis and a double acting band brake.

**SPEED**, maximum twelve miles per hour.

**GRADE**, maximum 20%.

**WHEELS**, wood, 34 inches in diameter with bronze artillery hubs.

**TIRES**, heavy construction pneumatic.

**STEERING GEAR**, wheel.

It is very important that the differential gear be removed from the rear axle and that the wheels turn on spindels in order to leave the rear axle clear between springs so as to be more easily repaired when injured and to offer less obstruction on bad roads.

The automobile market does not furnish today nor will it furnish in the ordinary course of progress, just the kind of a vehicle that will meet the conditions of the military service. There is no vehicle needed in civil life that is as light as our service ambulance and is drawn by four or six mules. Vehicles with as much power are heavy and are used for hauling heavy loads.

Our search in the market would have to be for a delivery wagon with the power of a truck. So, a motor-wagon of such design can only be secured by special construction.

The best and readiest method of procedure is to take the motor of a steam touring car of about 15 horse-power and apply it to the body of our regular ambulance with necessary modifications. Then select the wheels, tires, running gear and other details from the best on the market.

This process will assemble elements that have already been tried and found practical and will produce a serviceable motor ambulance in the very first construction.

Yet there must be some experiment. The first machine must be put to practical tests under service conditions and the developed defects remedied. Only in this way will a satisfactory vehicle be produced.

Undoubtedly the responsibility for developing this new form of transportation rests upon some department of the army. The passive interest that our War Department may have in the trials and experiments by foreign governments is hardly sufficient reason for lack of activity.

The policy of waiting for others to lead that we may follow is not American and whatever may be the attitude of other departments of the service toward this subject, that can not but interest them all to some degree, the time is at hand for the Medical Department of the United States Army to be equipped with the motor Ambulance.

## A SYNOPSIS OF RINGWORM CASES AT THE NAVAL ACADEMY DURING THE SESSION OF 1901-1902.

By J. BENJAMIN DENNIS, M.D.

PASSED ASSISTANT SURGEON IN THE UNITED STATES NAVY.

**D**URING the academic year 1901-02, there have been one hundred and twelve of the battalion of cadets under treatment for ringworm. Seven out of sixty-one of the first class, eleven out of fifty-two of the second class, and seventy-three out of one hundred and forty-eight members of the fourth class were affected, making a total of one hundred and twelve cases in the battalion of three hundred and thirty-three cadets; making a percentage of almost thirty-three per cent.

The disease first appeared on the U.S.S. Indiana during the first half of the practice cruise in the summer of 1901. The first case, that of a cadet of the second class, was contracted just prior to his starting on the summer cruise. Due to close quarters on the U.S.S. Indiana, and to the probable common use of toilet articles on that vessel, is to be attributed the spread of the disease among the cadets. During the first half of the summer cruise there were no cases of tinea on the U.S.S. Chesapeake, but when the exchange of cadets was made at the middle of the cruise, with the U.S.S. Indiana, there were about fifteen cadets under treatment for this affection when they were transferred to the U.S.S. Chesapeake. On arriving at Annapolis, when the cadets went on leave, these cases were much improved and some of them were well.

In October when the school term began quite a number of cases commenced reporting at sick call, and on the eighth of November the entire battalion was inspected, and strict sanitary measures were adopted to eradicate the malady. At that date there were seventy-five cases found in the school. Under the direction of the Surgeon in Charge the following sanitary regula-

tions were formulated and carried out. Each cadet was required to report at sick quarters twice daily for treatment. They were restricted to the use of special water-closets, which were washed daily with a strong solution of bichloride of mercury. They were prohibited from borrowing or lending toilet articles, or wearing apparel. All of their soiled clothes were sterilized by heat before being sent to the laundry.

There were various treatments tried in these cases, among which were:—bichloride of mercury in alcohol, 1-200; formalin in alcohol 2%; ungent formalin 4%; tincture of iodine and Churchill's tincture of iodine; carbolic ointment 8%; chrysarobin ointment 5%; and iodine in goose grease,—one part of iodine in eight parts of goose grease. The iodine preparations, in my opinion, gave by far the most satisfactory results, and the preparation of iodine in goose grease would be my preference in the treatment of tinea cases in the future, for the reason that it gives less irritation than any other of the effectual modes of treating this malady, and if faithfully applied, will give the most rapid cure and the least number of recurrences. Its one objection is that it is not cleanly and soils the patient's clothing. It can be applied twice daily and the patient will be able to perform his duties with little inconvenience. In the treatment of the cadets by other methods, it was found necessary to excuse them a greater number of times than when using the goose grease and iodine.

The parts of the body where the disease most frequently was located, were on the inner sides of the thighs, on the buttocks and in the axillae, although other parts were, to a less extent, found to be the seat of the disease.

There were quite a number of recurrences in which the cases had been apparently cured, but it was possible that in those cases the treatment had been discontinued too soon. In length of duration the cases varied from a few days to several weeks. At the present date, May 20th, there are but three cases under treatment and they are almost well.

The treatment with the goose grease was adopted after reading an article in the New York Medical Record, published in December, 1901. I regret to be unable to quote the physician's

name who wrote the paper, as the copy of the Record has been unfortunately mislaid. In treating patches of tinea on the face and arms bichlorid of mercury in alcohol, one part in two hundred, was found to give good results with no untoward symptoms.

The great number of cases arising from a single one makes it mandatory, to my mind, to adopt most stringent measures in regard to isolation of cases occurring in the government and other services. For, while the number of cadet sick days attributed to ringworm has been meagre, it has been found necessary to excuse a large number of the cases from their drills, and the amount of time they have necessarily spent in applying treatment, etc., must surely have detracted from the class standing of some of the patients.

In future contagions of this sort I am confident that the immediate segregation of the primary case or cases would be eminently proper, and would result in the curtailment of an immense amount of time to the affected, labor to the surgeons, and expense to the government.

#### COMPARATIVE MORTALITY OF THE FRENCH AND GERMAN ARMIES.

**T**HE mortality of the French army is nearly five times as great as that of the German army, and the sick rate is double.

Since the war of 1871 the German army has lost 13,000 men by sickness. During the same period the French army has lost 99,000 men by sickness. The causes for this increased mortality are an insufficient number of military medical officers, and the fact that those who are in the army have no authority to carry out hygienic and sanitary measures, the line officers paying little attention to their advice. Typhoid fever and tuberculosis are largely responsible for the high mortality. In 1900, 600 soldiers died in French garrisons from typhoid fever, and in the same year 87 German soldiers lost their lives from the same cause; 1415 French soldiers died from tuberculosis against 129 Germans. Respiratory diseases associated with tuberculosis killed 390 French and 197 Germans.

CLASSIFICATION, GEOGRAPHICAL DISTRIBUTION,  
AND SEASONAL FLIGHT OF THE MOSQUITOES  
OF THE PHILIPPINE ISLANDS.\*

By C. S. LUDLOW, M. Sc.

HISTORY OF THE WORK.

THE study of the classification of the mosquitoes of the Philippine Islands was originally begun by me in March, 1901, as a personal investigation relative and preparatory to quite different work, but quickly showed such a large and important field that it seemed worth while to pursue it for itself.

In April, 1901, it was suggested to the members of the Board of Health of Manila, then under the Provost Marshal General, and conducted by Medical Officers of the U.S. Army, as a suitable undertaking for their furthering, but no recognition was obtained. The collection and classification were, however, continued as a personal work at Orion, Bataan, with such interesting results both as to geographical distribution and the evident seasonal periods of flight, that in June the matter was laid before Col. B. F. Pope, since deceased, then Chief Surgeon, Division of the Philippines, who at once recognized its importance, and took steps to put the plans into execution, referring it to the Board of Health.

Circulars and outfits consisting of cyanide bottles and shipping boxes were sent out to about eighty Post Surgeons in various parts of the Islands, and returns began to reach Manila about the middle of August. On September 10, on account of the lack of laboratory facilities, incident to the change of location necessitated by the transfer of the Board of Health to the Civil Government, and the serious hindrances which this entailed, the work was, with the knowledge and consent of the Board of Health,

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\*An investigation carried on by the authority of the Surgeon General, and with the cooperation of the Medical Department, U. S. Army.



transferred to the Army Pathological Laboratory, Hospital No. 3, and was thus returned to Army auspices, under which it had begun.

During the month, Aug. 19-Sept. 10, returns were received from five Post Surgeons, four of the Army and one of the Navy, but the response to the circulars was far from general. A report of this work has been made to the Board of Health, Manila, but the results are incorporated here, because as the investigation was begun under the authority of the Medical Department, and is now being carried on with the cooperation of that corps and under the authority of the Surgeon General, it seems better to let the report cover the whole ground.

It was intended to make the work continuous for at least a year, but a serious interruption was caused by my return to the United States, and later by a misconception of the nature, scope and authority for my work at the Army Pathological Laboratory, Manila. Now it is once more in progress, and it is hoped will continue without serious hindrance until the object in view shall have been accomplished, at least to a fair degree.

#### DISTINGUISHING FEATURES OF THE VARIOUS GENERA OF MOSQUITOES.

During the past year the subject of the classification of mosquitoes has been entirely revolutionized by Mr. F. V. Theobald, of Wye, England, which has resulted in the forming of several new genera, most of which came from the old omnibus genera *Culex*. It is now no longer possible to say, given a straight proboscis fitted for piercing,—and, palpi long in both male and female, *Anopheles*: palpi long in male, short in female,—*culex*; palpi short in both male and female,—*Aedes*, and feel that, save the genera dependent on metallic coloring or peculiar leg scales, we have covered the ground fairly well. The old limitation for *Anopheles* practically stands, but *Culex* has been divided into *Stegomyia*, *Mansonia* (*Panoplites* of Theobald), *Wyeomyia*, *Trichoprosopoh*, etc., and these new genera are not based on anything so easily evident as length of palpi, but on the position and structure of scales, position of chætæ, length of certain joints of antennæ, wing structure, etc., points that require microscopic

study to discern, and much care, patience and discrimination to determine.

So also with regard to the resting positions, which were formerly declared as easily distinctive, as,—in *Anopheles* the body is held in a straight line at an angle with the resting surface; in *Culex* the body is in a bent line but lies in a general parallel with the resting surface. These distinctions are still partly true. The body of the resting *Anopheles* is rectilinear, and *usually* makes an angle varying from 30° to 50° or 60° with the resting surface, but some *Anopheles* (*A. maculipennis*, *A. Rossi*) at times rest with the body nearly parallel to the surface, though I have frequently seen *A. Rossi* stand at an angle of 60° with the wall, and Theobald says *Culex pipiens* may stand at an angle equal to that ascribed to *Anopheles*, while Col. Giles, of the English Army has found in India an *Anopheles* which at rest "exactly assumes the position of *Culex*." The sharply dropped abdomen often depicted for *Culex* is also by no means invariable, for though the proboscis is usually somewhat dropped toward the resting surface, the abdomen is frequently held nearly parallel to it. *Stegomyia fasciata*, as studied by me in the Philippine Islands, does not usually show this marked dropping of the abdomen, while its hind legs are very much raised, much more than in *C. fatigans* with which I had constant opportunity to compare it.

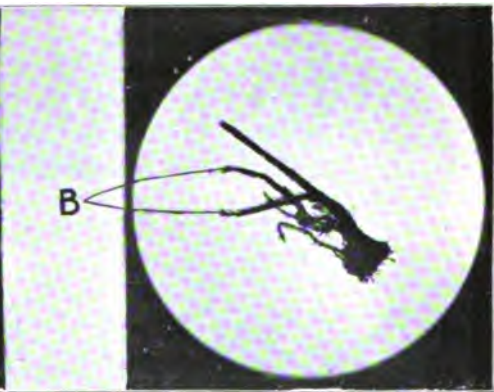
The distinctions on which the new genera are based seem discouraging to those who do not care to enter into entomological work, but fortunately for the pathologist most of these genera have at present little interest, and those which he is called to study have, except *Culex*, a few comparatively easily discernible characteristics.

For this work it is first necessary to determine the sex of the mosquito, for with few exceptions only the female is a blood-feeder, and this is easily done by the antennæ, the male always having very plumose organs, indicated in the accompanying photograph, so that in some parts of the country they are known as "woolly heads;" the female organs, on the contrary, being merely pilose (see photograph).

This point being satisfactorily settled, the female *Anopheles* is easily determined, having palpi approximately as long as the proboscis, and these may lie closely compressed to it, giving the effect of an extremely heavy "beak," in some cases so heavily scaled as to be nearly as wide at the base as the head itself, or they may lie slightly apart at the apex (see drawing), or infrequently in the rather irregular position (this only after death) shown in the photograph.



**Fig 1. Head of *Anopheles Rossii*,  
(proboscis detached).**  
A, male antennae  
B, palpi, showing spatulate joint.



**Fig. 2. Head of female *Anopheles*.**  
B, palpi, much displaced.

The male *Anopheles* is not so readily distinguished from other males, the principal distinctive feature being the last joint of the palpi, which is swollen or spatulate; the wing also shows the prolongation of second and third long vein into the base cells, and the shortness of the fork cells.

*Stegomyia* is technically based on the scales of the head and scutellum, but practically they can usually be easily distinguished as rather stoutly built insects, dark brown or black with silver (white) markings, the legs and abdomen usually white banded. Many of them are really beautifully marked. The female palpi are short, as in *Culex*, and those of the male long and generally nude. The description of *S. fasciata* will be given below in its place.

The genus *Culex* is extremely difficult to define without having recourse to scale structure, because it still includes such a

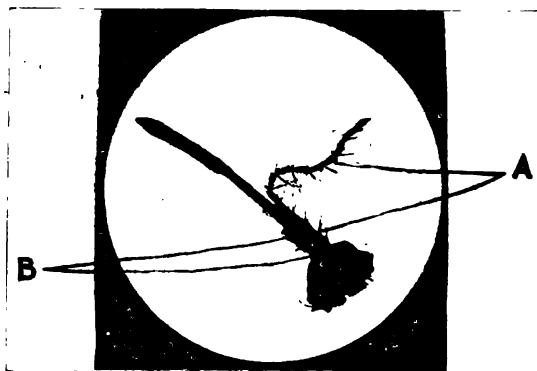


Fig. 3. Head of female *Culex*.

A, antenna  
B, palpi

variety of forms that any lines are likely not to include them all. The palpi of the female are short (see Fig. 3), those of the male long, and the latter vary in the shape of the last joints, being sometimes swollen like anophelids, sometimes

narrow and pointed like *Stegomyia*, and at times having a long brush of hairs.

Theobald gives the distinctions as:

"I. Short palpi in the female, long in the male.

"II. Head with narrow curved and forked scales on the occiput, never flat scales over the top of the head as in *Stegomyia*.

"III. Narrow curved or spindle-shaped scales on the scutellum, never broad flat ones.

"IV. Wing veins

with median scales and long thin lateral ones on some or all the veins;"—

and adds: "All these characters are clearly seen with a strong

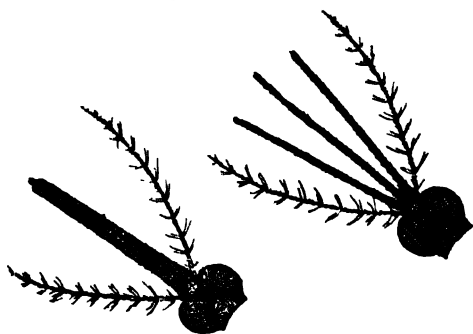


Fig. 4. Heads of female *Anopheles*, showing position of palpi.

hand lens, but are best examined under the microscope with a  $\frac{2}{3}$  in. power lens."

The only one of marked pathological interest as a disease host, so far as reported, is *C. fatigans*.

A diagrammatic drawing of a mosquito and wing (Fig. 7) is given on page 91 for those who wish to study out these points.

The panoplitcs of Theobald will probably be known hereafter as *Mansonia*, as proposed by Blanchard, Theobald's name being already occupied in zoology. This is one of the genera formed from the old genus *Culex*. Its distinguishing mark is the

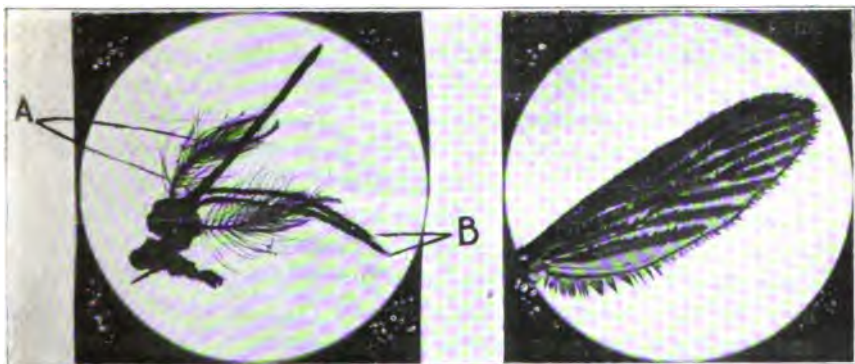


Fig. 5. Male *Stegomyia*  
A, Antennae; B, palpi.

Fig. 6. Wing of *Mansonia annulifera*,  
Theobald.

broad asymmetrical ("bracket-shaped") scale which densely covers the wing, but in this it closely resembles *Aedeomyia*, so that the identity is only assured by the capture of males, which in this genus have long palpi. The legs are also usually white banded or mottled. *M. Africanus* has been found to be *Filaria*-bearing in Africa, but so far experiments with malaria have given negative results.

*Aedeomyia* has palpi in both sexes short, and so far as known is of no pathological interest, so that no special mention of it is necessary here.

#### LIST OF GENERA AND SPECIES COLLECTED TO DATE.

In classifying the mosquitoes under consideration, the geographical position of the Philippine Islands at once suggests that,

except for widely spread cosmopolitan species, the tropical and sub-tropical forms will uniformly be found, and so far as the mosquitos of these countries are known, it would seem fairly certain that those of the Malaysian Peninsula, China, and the Islands lying to the southward, and more especially of those nearer countries with which mercantile connection is well established, would be collected. This points at once to the futility of looking for European species for pathological study. It may be that *A. maculipennis* (*A. claviger* of older writers) will prove present, though it has not been found in this part of the world, but even the small data now available show sufficient material at hand for such study without wasting time looking for a special species.

The geographical indications suggested above have proven largely true, but there occur curious small changes only to be accounted for as "insular variations." These variations prove at once of interest and vexation, for when an insect appears with the general markings of one species, and very distinct leg-markings of another, or we find it conforms in part to the description of two or three different sub-species, and still varies slightly from them all, the question of classification becomes rather bewildering. Do these changes break down the already existing lines, and throw the species or sub-species into one very variable form, or are new varieties to be formed, and when will the variation become large enough to warrant the establishment of new species, are questions constantly confronting the investigator.

In the list given below will be found some mosquitoes which do not agree with the description of the types under which they are placed, but it has seemed better to leave them there, noting such differences as occur, rather than further complicate the species by new varieties, while in two cases the variations have seemed large enough to warrant the creation of new species.

*Anopheles sinensis*, Wiedeman.

Orion Bataan

June.

Sub-species *annularis*, van der Wulp.

Hagonoy, Bulacan.

Sept. 24-Oct. 5.

Hospital No. 3, Manila.

Sept. 21.

Under *A. sinensis* Wied., Theobald has placed four sub-species, among them *annularis*, van der Wulp, and *pseudopictus*,

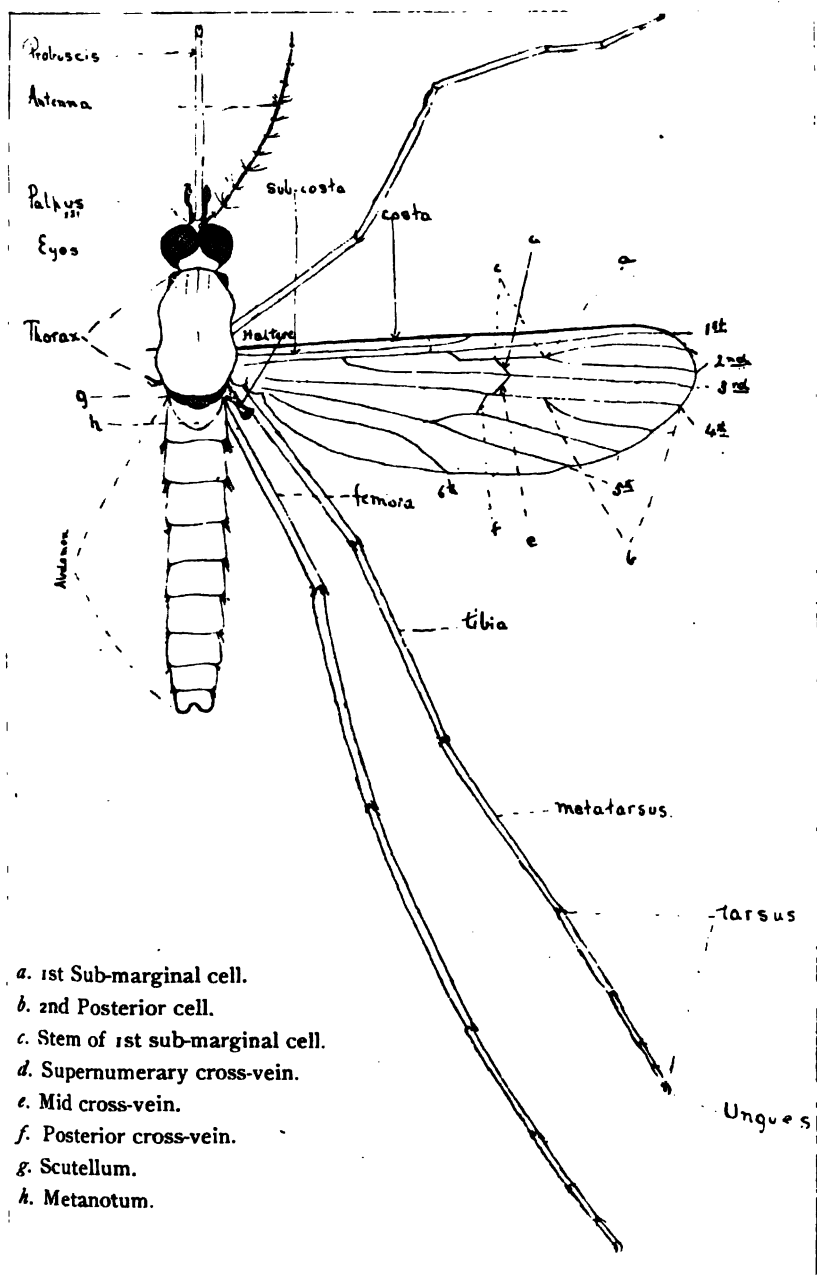


Fig. 7. Diagrammatic Drawing of Mosquito. *After Theobald.*

Grassi, which differ from each other mostly in some wing markings and in the relative length and position of the posterior and mid cross-veins. The specimens collected in Manila and sent me from Hagonoy, while agreeing largely with *annularis*, agree also in some points which belong distinctively to *pseudopictus*, and in still others disagree with both, and as this intermediate form practically connects both the mentioned sub-species, I am very strongly inclined to agree with Giles in preferring to keep all these forms as one very variable species.

I add a generalized description, which will not, however, be definite enough for determining the sub-species.

*A. pseudopictus* is a host for the estivo-autumnal parasite, and this form, which is so closely related, may also prove of pathological interest.

Head blackish with white frontal tuft, the dark scales on the occipit grey tipped. Antennæ brown. Palpi deep brown, apex white-scaled, and two white bands, at apices of 3rd and 4th joints. Proboscis black. Thorax slaty-grey with brown longitudinal stripes. Abdomen brownish black with long golden hairs. Legs yellowish brown, tibiæ and tarsal joints, except the last, with apical light bands, in the mid and fore legs often faint or absent. Ungues equal and simple. Wing covered with dark brown or black scales, with two light spots on the costa, one sub-apical, the other a little in front of the cross-veins; the rest of the wing rather dark with a few small pale spots on the field, and the fringe pale at the apex.

Length 4-6 mm.

*Anopheles pseudobarbirostris*, n. sp.

(female)

Head very dark brown with some pale scales on top, spread in front toward the sides and partly around the eyes, tuft in front white with a few dark hairs, and dark hairs behind the eyes, otherwise covered with rather broad not deeply forked scales with fimbriated tops, the tips grey; narrow median space bare. Antennæ a lighter brown, minute white apical bands on the joints, first joint brown; vertices brown, pubescence white. Palpi very heavily scaled with dark brown (almost black) scales, many of which are ochraceous tipped, so that the effect is "rusty,"—joints



obscure, but can be seen by the breaks in the scales,—as long as the proboscis; last joint with brown hairs. Proboscis also heavily dark scaled, some ochraceous tipped, tip is lighter but still brown. Eyes dark brown, narrow white rim part of the way round.

Thorax dark brown with grey reflections, and narrow curved (almost hairlike) golden scales, arranged in faint, i. e. indefinite lines which in some lights seem to converge so as to form a "V" from the cephalic edge, the whole length of the thorax, the point caudad; pleuræ brown with white markings; scutellum brown at center, paler laterad, with slender golden curved scales (such as are on the thorax) and golden bristles; metanotum brown.

Abdomen dark brown, slight greyish reflections, golden hairs; on the ventral side are a few scattered white scales, and near the caudal end a bunch of rather long brown scales.

Legs,—coxæ and trochanters all dark brown, white tipped; femoræ and tibiæ all dark brown well sprinkled with white scales, the rest of the legs a little lighter brown, and in some lights giving almost "fawn-colored" reflections; all the joints of the legs and feet are white tipped, except the last tarsal joints, and on the mid legs these are a little lighter, giving almost "clay-colored" reflections; unguis simple and brown.

Wings dark with two small yellow spots on costa, one at the apex of the wing and extending on the apices of the 1st longitudinal vein and anterior fork of the 2nd longitudinal, with light spots on the fringe at apices of the 1st long. and anterior fork of the 2nd longitudinal, and an included dark spot at apex of marginal cell, giving the appearance of an incomplete ring (c); the other, much smaller, on the costa at the junction of the sub-costa. The costal and basal portions of the wings are dark scaled with a few white scales on the costa, sub-costa, 1st and 2nd longitudinal, but the 3rd longitudinal is mostly white scaled, and on this appear a few round-ended scales with acuminate tips. The 4th longitudinal is largely dark scaled, but the scales are mostly of the roundish sort, which are either black or white; there are dark spots at the apices of each fork and light fringe at the apex of the anterior fork. The 5th longitudinal has almost exclusively the rounder scales and is mostly white, both as to stem and forks; dark spots at the apices of each fork. and the stem has a dark

base, as have all the veins save the 6th, which is light scaled, except two heavy dark spots, one at the apex and one about the middle of the vein. The 6th has entirely the round-ended scales in both black and white.

The fringe is dark except for the three small places indicated, i. e., at the apices of 1st longitudinal, anterior fork of 2nd, and anterior fork of 4th longitudinal. Most of the veins, even where light, have a sprinkling of the dark among the median scales, but the larger part of the dark scales on these veins are lateral scales and lie close under the median scales, so that the wing looks much darker from the under (ventral) view, and in all the veins caudad



**Fig. 8. Wing Scales.**  
Vein scales—*anopheles pseudo-*  
*barbitrostris*. Lud.



**Fig. 9. Wing Scales.**  
Fringe scales—*anopheles*  
*pseudobarbitrostris*. Lud.

of the 3rd the lateral as well as the median scales are almost entirely of the "round-ended" sort. The wing has, however as a whole a dark rather than light appearance, probably due to the very heavy scaling of the first two or three veins, which are mostly dark scaled. The 1st sub-marginal cell is a little longer and narrower than the 2nd posterior, the base of the former nearly on a line with the base of the latter, but not near the junction of the costa and sub-costa; the stem of the former is about two-thirds the length of the cell, and shorter than that of the 2nd posterior, which is longer than the cell; the cross-veins are close to

gether, the mid vein much the longest, meeting the supernumerary at nearly a right angle (apex toward the apex of wing), and the posterior cross vein is not half its length from the mid-vein and stands at almost the same angle in the reverse direction. The halteres have black knobs, stem and base are light.

Length 5 mm.

Habitat, Hagonoy, Bulacan, Luzon, P. I.

Caught Oct. 2, 1901.

We have here one of the *sinensis* group, and evidently near *A. barbirostris* van der Wulp, the "round-ended" scales being undoubtedly the same as those described by Theobald for that species, but apparently more numerous and wider spread on the wing than is indicated for that, while the differences in antennæ, palpi, wings and legs are, especially the latter, so marked as to throw it out of that species.

No pathological work has been done with this species.

*Anopheles Rossii.* Giles.

Orion, Bataan,	May 10,-July 25,
Hagonoy, Bulacan,	Oct. 5,
Batangas, Batangas,	Nov. 11,
San Jose, Abra,	Sept. 1,
? ? Banquet Mts.	April 15, 1902.

The Philippine Islands specimens show some very marked variations from the type; one which will be instantly noticeable being "the curious mottled appearance of the femoræ and tibiæ" which Theobald gives as distinctive of *A. costalis* Loew., and it may be that this is an intermediate species, but I have left it here for the present.\*

I copy the general description given by Col. Giles in his "Gnats or Mosquitoes."

"Wing with the costa pale at apex and base, but generally black, interrupted by two large yellowish spots opposite the fork cells, and, just in front of the cross-veins respectively; the black

\*This species has been lately determined by Theobald as new, and described by him as *A. Ludlowii*. It is the first *Anopheles* taken in connection with this work, and the first specimen was caught flying at midday, tho' they usually fly at night. It is also the most widely distributed and much the most numerous of the *Anopheles* so far collected in the P. I., and its time of prevalence coincides largely with the prevalence of estivo-autumnal and "black-water" fevers, so that pathological work on it is likely to give positive results. *A. Rossii*, Giles has lately been sent from one Station. C. S. L. Dec., 1902.

area next internal to these is very large and is T-shaped, owing to the presence of a short length of black upon 2nd longitudinal vein beneath the middle of the thrice longer area on the costa and auxiliary (sub-costa); internal to this there are only three minute white dots; there is a row of sub-apical black dots on every one of the long veins, and three or four others, and the fringe is yellow at the tip, and has pale patches at all the longitudinal junctions, except that of the 6th. Tarsi with yellowish rings on all but the last articulations of the fore and mid legs. Thorax deep brown with, in the fresh state, a dorsal, tun-shaped patch of velvety, pale cinerous bloom. Abdomen dusky, nude, densely clothed with golden brown hairs. Length 4.6-6 mm.



Fig. 10. Wing of *A. Rossi* (male).



Fig. 11. Wing of *A. Rossi* (female).

This is the most numerous and most widely distributed of *Anopheles* so far collected in the Islands. It is a host for the estivo-autumnal parasite, and for *Filaria sanguinis hominis nocturna*, and the *A. costalis* to which our species seems also related. is a host for the same plasmodium and also for filaria.

*Anopheles Philippinensis*. n. sp.  
(female)


Head very dark brown, with white and creamy (yellowish) scales scattered on top, and more thickly toward the front, long white tuft in front, a few yellowish scales on the sides, and very dark forked scales with fimbriated tops on the occiput, antennæ

golden brown, some white scales and some brown at the base with lighter tips; verticels white. pubescence white, first joint basally brown but white at apex; eyes dark brown or black with very narrow white rim; palpi golden brown, some scales apparently darker tipped, the last joint white and a narrow white band at apex of each of the three preceding joints, a few white scales at the base; proboscis brown, not so dark as the head but darker than the antennæ, white or yellowish tip.

Thorax very dark brown (both it and the head are almost black) with scattered white flat and yellowish curved scales, no design apparent.—cephalad the white scales are much longer; scutellum dark brown in the middle and at each end with a lighter spot between, on which are a few white scales; metanotum dark brown; pleuræ dark brown with white markings; when denuded, thorax has ashy-grey reflections with dark brown median and sub-median lines.

Abdomen dorsally is ashy-grey, with golden brown hairs, a narrow brown apical band on each segment, much broader on the last two segments so that they are nearly brown instead of grey.

Legs, coxæ brown, all white tipped, femoræ dark, i. e. brown scaled dorsally and yellowish on the ventral side, tibiæ same but a very small apical white spot on fore and mid legs; metatarsus and two following joints on the fore legs have heavy apical white bands, mid legs have faint light bands in same positions, that on the metatarsus much the heaviest, but still not by any means so broad as on the fore legs; hind legs dorsally brown, and yellowish ventrally, much as in the other legs, but the apical *half* of the first tarsal and all the following joints pure white. Ungues on hind legs light (white), those on mid and fore legs brown.

Wings cream colored, spotted with brown, reminding one of *A. Jamesii* Theob. Two small and four large brown spots on costa, the distal extending back through anterior fork of 2nd longitudinal, the next, somewhat larger, through 1st longitudinal, the third and largest of all, extends as a long spot on the costa and sub-costa, and three small ones on the 1st longitudinal, so arranged as to resemble an overturned E ( , the middle of these small spots is the largest and connects with one on the 2nd longitudinal; the 4th spot, counting from the apex of the wing,

includes the sub-costa and 1st longitudinal, and even the two small ones include the sub-costa, making all these costal spots very distinct. The apex of the costa is, however, light. There are two dark spots on anterior fork of the 2nd longitudinal, and one on the posterior fork; two small spots at the bases of the 3rd longitudinal, one on the anterior fork of the 4th, a small one near apex of the posterior fork, and the stem is dark to posterior cross-vein and, after a small white spot, about one half the way to the base of the vein; anterior fork of 5th has three dark spots, and



**Fig. 12. Wing of *A. Philippinensis*.**

The fringe is mottled, cream and brown, nearly equal to the 6th longitudinal, after which it is dark. Dark spots occur in the fringe at the apex of the anterior fork of the 2nd longitudinal and at apices of 1st posterior, 2nd posterior, 3rd posterior, anal, auxiliary, and spurious cells (Theobald's naming) with light spots at the apices of each intervening vein. The first sub-marginal cell is a little longer than the second posterior, the base of the former being a little nearer the base of the wing. The posterior cross-vein is about one and one-half times its length nearer the base of the wing than the mid cross-vein, and the supernumerary about its length nearer the apex than the latter.

Length, including proboscis, 5 mm.

Habitat, San Jose, Abra, Luzon, P. I.

Caught, Sept. 1, 1901.

there is one near the apex on the posterior, also on the stem of the 5th near base of wing; there are three dark spots on the 6th, one at the apex, one near the middle and one near the base. A large part of the 2nd and 4th are therefore dark, while the 5th has a large part cream-colored, and a still larger proportion of the 3rd is light.

The fringe is mottled, cream and brown, nearly equal

*Stegomyia fasciata*. Fabricius.

Angeles, Pampanga,	Aug. 19,
Aparri, Cagayan,	Aug. 23-Sept. 24,
Cavite, Cavite,	Aug. 31,
Dumaguete, Negros,	Sept. 24,
Hagonoy, Bulacan,	Aug. 19,-Oct. 5,
Manila, Rizal,	July 30,-Oct. 1,
"	April, 1902,
Orion, Bataan,	May 15-Sept. 10,
Pasig, Rizal,	Aug. 22,
San Jose, Abra,	Sept. 1,
Batangas, Batangas,	Nov. 16,
Cebu, Cebu,	March 20, 1902.

This mosquito was not found in Manila in February or March, 1901, nor before I went to Orion early in April. nor was it flying at Orion at that time, but it appeared in Orion in May, and when I returned to Manila in July it was the prevalent mosquito at the Cuartel de Infanteria; it was sent me from other districts of the city shortly after and continued till I left for the States, Oct. 1, though I did not find it at Fort Santiago during Sept. It is, however, apparently very widely distributed, being sent from every post where collections were made except the "Banguet Mts.," and I believe will, in common with *Anopheles*, prove to have a distinct season of flight.



(Female.)

Head black with white patch in the middle extending back to the neck, a white patch on each side, a narrow white border to the eyes; antennæ blackish with narrow pale bands, pubescence and verticels dark brown, palpi black scaled, the last joint tipped with pure silvery white scales, sometimes entirely white.

Thorax dark brown with a heavy pure white curved band on each side, curving inwards about the middle of the mesonotum, and continued back as a thinner pale line to the scutellum, two thin parallel sub-median lines extending over more than half of the mesonotum and broken near the scutellum; a short white median line in front (cephalad) between these two slender lines and another near the scutellum, just cephalad of the broken part

of these two sub-median lines. Scutellum with a row of white scales, sometimes intermittent; pleuræ dark brown with several silvery patches.

Abdomen dark, brownish black with white basal bands and white, more or less triangular, patches on the sides.

Legs rather dark, femoræ with white tips, tibiæ still darker. metatarsi with basal white bands; on the fore and mid legs only the first joint of the tarsus white banded, the rest black. hind tarsi all basally white except the last joint, which is pure white. Fore and mid unguis uni-serrate, hind unguis simple.

Wings clothed with very long narrow brown scales.

Length, 3.5-5 mm.

(Male.)

Darker and somewhat smaller, marked much as the female, the palpi black with four white bands, and the thorax more brilliantly marked than in the female.

This is the mosquito which the experiments in Cuba have shown transmits the "yellow fever."

*Var. Mosquito*, Desvoidy.

Hagonoy, Bulacon,  
San Jose. Abra,

Aug. 19, -Oct. 5.  
Sept. 1,

This differs from the type in lacking the fine sub-median and median lines.

*Var. Luciensis*, Theob.

Batangas, Batangas,

Nov. 16,

The distinctive marking from the type is a black tip to the last tarsal joint of the hind feet.

*Stegomyia Scutellaris*, Walker.

Angeles, Pampagga,  
Cavite, Cavite,  
Orion, Bataan,

Aug. 19,  
Aug. 31,  
June 4, -16.

As this is not known to have pathological value no description is attempted.

*Var. ....*

Is equivalent to *Var. Luciensis* under *S. fasciata*, in that it has a black tip on the last tarsal joint of the hind foot.



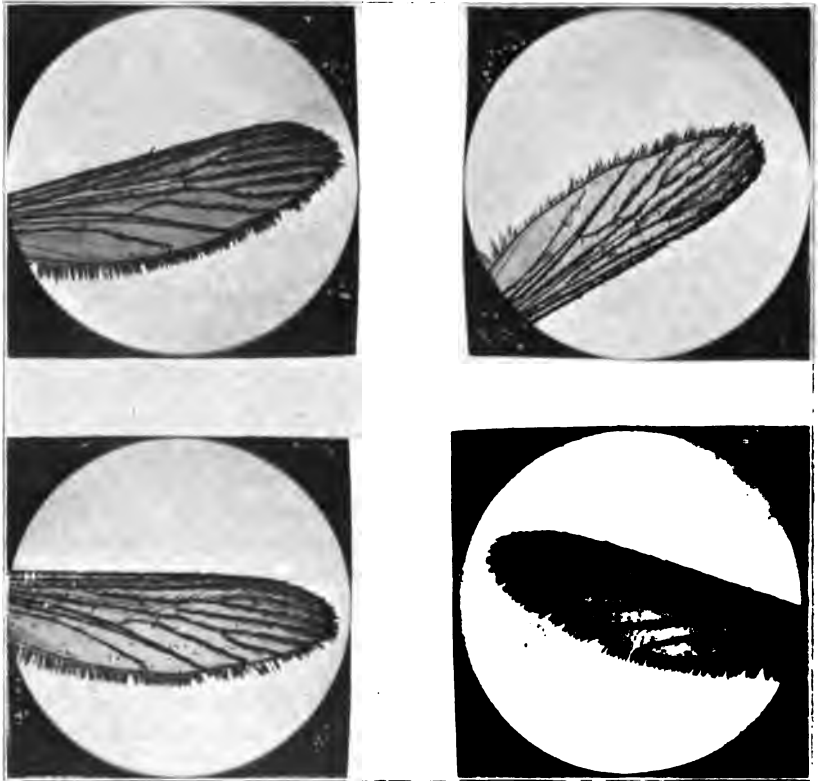
<i>Culex sitiens</i> , Wied.	
Hagonoy, Bulacan,	Oct. 5,
Orion, Bataan,	May 28,
<i>Culex Annulioris</i> , Theob.	
Hagonoy, Bulacan,	Oct. 5,
<i>Culex caecus</i> , Theob.	
Cavite, Cavite,	Aug. 31,
Hospital No. 3, Manila,	Sept. 25,
Hagonoy, Bulacan,	Oct. 2,
<i>Culex gelidus</i> , Theob.	
Hagonoy, Bulacan,	Oct. 5,
<i>Culex fatigans</i> , Wied.	
Aparri, Cagayan,	Aug. 23-Sept. 24,
Cavite, Cavite,	Aug. 31-Sept. 14
Dumaguete, Negros,	Sept. 24,
Hagonoy, Bulacan,	Aug. 1-Oct. 5,
Manila, Rizal,	Feb. - ept. 30,
" "	April 1902.
Orion, Bataan,	April 7-Sept. 10,
Pasig, Rizal,	Sept. 3-Nov. 16,
San Jose, Abra,	Sept. 1,
Batangas, Batangas,	Nov. 16,
Cebu, Cebu,	March 20. 1902.

These dates are of course merely dates of collection, and must not be taken as indicating the period of flight, either in this or any other of the genera, for in some cases only one collection was received, while in no case were observations carried on a complete year. It seems probable, however, that this mosquito is always present; it is the prevalent mosquito in Manila during the dry season and in the districts of the city under observation the only one taken in Feb., March and early April, 1901, while there was certainly no apparent diminution in numbers (though other species were also found) in late July, August and September.

It is well known as a carrier of the embryo of *Filaria nocturna*.

The general description from the British Museum Monograph (Theobald) is appended, but it is an extremely variable mosquito, and besides some closely allied species there are four varieties, so that, to one not acquainted with it, it is a very troublesome species to determine accurately.

Thorax brown, with two distinct dark lines on the denuded surface, covered with pale golden curved scales, and with two or three rows of dark bristles, ornamentation variable. Abdomen dark brown to black with basal white or creamy curved bands and white lateral spots; venter white or yellow scaled. Legs



Figs. 14. 15. 16. 17, *Culex* wings, showing variation in length of stem of first sub-marginal cell.

dark brown; bases of the femoræ and coxæ pale, knee spot and sometimes the apex of the tibiæ with faint yellow spot; ungues of the female equal and simple; in the male the fore and mid ungues are unequal and unserrated, the hind equal and simple. Wings with the first sub-marginal cell longer and narrower than

the second posterior cell, its stem variable in length, never less than one-quarter the length of the cell. Posterior cross-vein distant twice or more its own length from the mid cross-vein. Head brown with pale golden brown to creamy curved scales and a few scattered black, dark brown or occasionally ochraceous upright forked scales, flat creamy white scales laterally; antennæ dark brown with pale pubescence; palpi densely covered with deep brown (sometimes a few pale grey) scales; proboscis dark brown (sometimes paler in the middle) and pale apex.

*Mansonia* (Panoplitæ of Theobald) *annulifera* Theob.

Hospital No. 3, Manila,	Sept. 21,
Pasig, Rizal,	Sept. 3-14,

*Mansonia uniformis*, Theobald.

Casual Camp, Hosp. No. 3, Manila,	Sept. 25,
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*Mansonia Africanus*, Theobald.

Casual Camp, Hosp. No. 3, Manila,	Sept. 21-25.
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All these mosquitoes are spoken of as "fierce and persistent," and *M. Africanus* has been found to carry the embryo of *Filiaria nocturna* (*Filaria Bancroftii*.)  
(Female.)

Head brown with narrow curved grey scales and flat white ones at the sides, a white border round the eyes, and numerous long dark brown scales; proboscis dark brown to almost black, with broad median yellow band and yellow apex; palpi dark brown, apex white scaled and a band toward the base; antennæ brown, broadly grey banded; thorax dark brown with narrow curved hairlike golden brown scales; silvery ones in two sub-median lines running on each side of the bare space in front of the scutellum and forming two more or less distinct spots on the anterior third of the mesanotum. Abdomen dark brown, the basal segments with basal median yellow spots, the apical with yellow apical spots; venter pale with creamy scales, apex often mostly white scaled; legs dark brown, banded and mottled with white. Wings with black and yellow asymmetrical scales.

(Condensed from Theobald's description).

Length 3.8-4.5 mm.

*Aedeomyia Squammipenna*, Arribalzaga.

Hagonoy, Bulacan,	Oct. 2-5.
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## NUMBER OF GENERA COLLECTED 5,

Anopheles,	Stegomyia,	Culex,
Mansonia,	Aedeomyia.	

## NUMBER OF SPECIES AND VARIETIES IN EACH GENUS.

Anopheles 5,	Stegomyia 5,	Culex 5,
Mansonia 3,	Aedeomyia 1.	

Total No. of species and varieties 19.

## LIST OF STATIONS AT WHICH COLLECTIONS WERE MADE.

Angeles, Pampanga, Luzon,	Capt. Ira Ayer,
	Asst. Surg., U.S.V.
Aparri, Cagayan "	Capt. G. A. Skinner,
	Asst. Surg., U.S.A.
Batangas, Batangas, "	Maj. W. F. de Nieoman,
	Surgeon, U.S.V.
Cavite, Cavite "	Dr. G. A. Lung,
	Surgeon, U.S.N.
Cebu, Cebu, (en route, 1902)	Maj. R. P. Ames,
	Surgeon, U.S.V.
Dumaguete, Negros,	Dr. John N. Merrick,
	Cont. Surg., U.S.A.
Hagonoy, Bulacan, Luzon,	Dr. W. V. Kellogg,
	Cont. Surg., U.S.A.
Manila, Rizal "	
Ermita,	Maj. Charles Lynch,
	Surgeon, U.S.V.
"	C. S. Ludlow,
Hospital No. 3,	Maj. J. D. Glennan,
	Surgeon, U.S.A.
Casual Camp, Hospital No. 3,	Maj. J. D. Glennan,
	Surgeon, U.S.A.
Sta. Cruz,	Dr. Gomez,
	Board of Health.
Manila (Walled City),	Dr. Jobling,
	Board of Health.
" " "	C. S. Ludlow,
Orion, Bataan, Luzon,	C. S. Ludlow.
" " "	Dr. Pedro del Rosaria,
Pasig, Rizal, "	Capt. G. S. Wallace,
	Asst. Surgeon, U.S.V.
San Jose, Abra, "	Dr. Alonzo Graves,
	Cont. Surg., U.S.A.
Banguet Mts., "	Dr. Alonzo Graves,
	Board of Health.

No. of stations at which mosquitoes were collected 16.

No. of collectors 16.

## GENERAL REMARKS ON THE WORK.

It has been impossible for me to obtain the elevations of the various stations at which collections were made, but a glance at the map shows that, with the exception of the mosquitoes from Angeles, Pampanga; San Jose, Abra, and "the heart of the Banguet Mountains," all the mosquitoes taken in Luzon were from stations either on the sea coast, or on rivers within a few miles of the coast, while even those mentioned were captured at comparatively low elevations, those from Banguet probably coming from the highest altitude.

As to the prevalence of these insects in different parts of the Islands, Hagonoy, which lies low, has been by far the most prolific in numbers and kinds of mosquitoes; Pasig and Orion, also low-lying, have shown good supplies, while from San Jose came the largest collection (taken at any one time) of *Anopheles* and *Stegomyia*, though one lot from Hagonoy contained nothing but *Stegomyia*, and the lot from the Banguet Mts., taken in a camp "located on the banks of a small river, in a lone cañon with tall, steep mountains on either side" where "we see the sun only between 9 A. M. and 4 P. M.," contained only *Anopheles Rossii*. *Stegomyia fasciata* has been sent in from every collecting station except the Banguet Mts., *Culex fatigans* has come from nearly as many posts, and *A. Rossii* is also frequently found. These seem to be the prevalent mosquitoes, but we have so far almost no insects from the interior, and nothing from the really high land, and no definite conclusions are possible.

There are, however, even in the short time that collections were made, indications to show periodicity in the flight of some of these mosquitoes. The extremely small variations of temperature in the Islands as a whole preclude the idea that it is governed by that, but apparently the dry season is the resting period for some, and this could easily be accounted for by the known preference of some mosquitoes for clean fresh water when laying eggs. *Culex fatigans* will lay its eggs in absolute filth, but the *Anopheles* will, as a rule, use only clean fresh water, such as roadside pools in which are no frogs or fish, but where the lower (unicellular) algæ are often found. *Stegomyia* also prefers fresh

(clean) water, and as these pools dry up during the dry season, the disappearance of these mosquitoes would naturally follow. It is claimed that they rest in the adult state hidden in the dark corners of houses, etc., only waiting for a new supply of fresh water to recommence their activities.\*

A glance at the list given above makes it at once evident that while, through the kindness of the Surgeons mentioned we have gotten a fair start on the classification of the mosquitoes of the Islands, the lack of general response to the original circulars, and the unfortunate interruptions in the collections already begun, have rendered it impossible to form any conclusions as to the distribution, and still less of the seasonal period of flight of these insects, and the problem we have undertaken is in truth hardly begun. New outfits and circulars have, under the authority of the Surgeon General, been sent to about one hundred posts since Jan. 16, 1902, and a few returns have already been received. There has hardly been time for a general response yet, but it is hoped that this effort will meet with more success than the last, and at the end of another year the report will be able to give important data both as to the geographical distribution and the seasonal flight of the mosquitoes of the Philippine Islands, for the use of those who may be making especial study of disease conditions on these Islands.

In closing this report I desire to express my thanks to General Sternberg for his personal interest in and official recognition of the work, without which its continuance would not have been possible; to those who gave it efficient aid at its inception, Col. B. F. Pope, Maj. F. B. Meacham, who are since deceased, and 1st Lt. W. J. Calvert, Asst. Surgeon, U.S.A., to Mr. F. V. Theobald, of England, and Dr. L. O. Howard, Dept. of Agriculture, for their friendly interest and help; to the Chief Surgeon, Di-

\*This is especially true of the seaboard and where fresh water is scarce during the dry season, but inland where fresh water is found at all times of the year, as in the Banguet Mts., the Anopheles are most numerous during the hottest part of the dry season, and disappear to a great extent with the scouring rains of the wet season, so that later in the year they are scarcely to be found. It appears that this is also the time of greatest prevalence of malarial fevers so that it seems probable that A. Ludlowii, Theob., the mosquito sent in from these Mts., will be proven a host for Estivo-Autumnal fevers in the P. I. thro' the reports from India are contradictory.

The time of flight cannot, however, be definitely given for the whole of Luzon as the wet season in one part of the island does not coincide with that of another part, the provinces lying on the China Sea showing a difference of some weeks from those on the Pacific. C.S.L.

vision of the Philippines, for his present assistance; to Col. A. C. Girard, Assistant Surgeon General, Commanding Officer of the Presidio General Hospital, for his unfailing interest and prompt and effective aid in recommencing the work, and finally to Dr. Chas. F. Craig, Pathologist to the Hospital, for his unvarying courtesy and encouragement, for many valuable suggestions, and for the photo-micrographs which illustrate this report, to whose kindness and skill they are entirely due.

### AVOIDANCE OF SOIL POLLUTION IN CAMPS.

WHEN the necessary implements and labour are available, buckets may be substituted for trench latrines, and all refuse removed and buried at such a distance from camp as to render pollution of the soil a matter of no practical importance. When the above method cannot be carried out—and this will usually be the case—and sufficient space is available, latrines and refuse pits should be shallow in order to subject their contents rapidly to the influence of nitrification, and frequently filled in, in order not to overtax the agencies on which the process depends. The contents of latrine trenches and rubbish pits dug several feet deep are removed from the influence of those nitrifying agencies, which, it must be remembered, being aërobic, are to be found in the upper layers of the soil only. The conditions in such a case probably resemble those found in a septic tank, liquifaction of organic matter taking place under the influence of anaërobic organisms. Percolation under these circumstances would seriously endanger neighboring water supplies. These disadvantages must, however, at times, be overlooked, and under some circumstances need never be considered. In actual practice every method is found to have its disadvantages, and even with the greatest care and with unremitting attention all organic matter will, as already stated, be neither removed nor buried, as a certain amount—the result largely of fæcal pollution by cattle—must under ordinary circumstances remain adherent to the surface of the soil.—*Major. R. Caldwell in British Medical Journal.*

## THE SANITARY WORK OF THE UNITED STATES ARMY MEDICAL DEPARTMENT IN ALASKA.

By MAJOR RUDOLPH G. EBERT,

SURGEON IN THE UNITED STATES ARMY; LATE CHIEF SURGEON  
OF THE DEPARTMENT OF ALASKA.

**T**HE principal factor that caused the establishment of a military department out of the territory embraced in the district of Alaska, was the lack of legal enactments to enforce order and protect property in a country without courts and about to be over-run by a horde of searchers after wealth in the newly discovered gold fields of the Seward peninsula.

The date of the departure of the Headquarters of this new department from Seattle for Nome and St. Michael, brought the information of the passage by Congress, and the signing by the President, of the bill, which abrogated the old laws, and established the new Alaskan Code. The fact that the Federal Judges and other officials, in whom was practically vested the authority to establish the new laws, found inferior (commissioner's) courts, organize municipal governments, etc., had only been named, and would not arrive for some time, and a copy of the law itself, as finally passed, not being obtainable, produced a chaotic state, at a time when the community was swamped by an influx of adventurers, amongst whom were many of the vicious characters of the West. A state of lawlessness and anarchy was fast being reached, as shown by three homicides in the twenty-four hours previous to the arrival of the Department Commander, and the self constituted city government of the winter, which had excellently served its purpose amongst the miners, was forced to suspend under the inrush of the spring "stampedeers."

At the request of the "Chamber of Commerce," perhaps



the only responsible body of citizens, General Randall assumed control, and until the arrival of Federal Judge Noyes, it might be said that Nome was under martial law; the one company of Infantry acting as police force; the commanding officer of the troops as mayor; the Judge Advocate temporarily deciding law problems, and the Chief Surgeon performing the duties of Sanitary officer,—all under the direction of the Department Commander.

How well that duty was performed, one need but inquire of any of the respectable element of society, as to the conditions existing under the military regime and the times preceding and subsequent to that period.

It is with the work of the Medical Department that this paper has to deal, and, to understand the situation, a description of Nome from a sanitary point as it appeared in the last week of June, 1900, is a necessity.

The first stampede to Nome was in the summer of 1899, too late for the people from the States to reach its golden beach, in any great numbers. About 2700 inhabitants remained during the following winter, and a town, housing that number, had been hurriedly built on the land situated at the edge of the tundra to the east of Snake river, and partially extending to the sand spit between that stream and Behring sea. As the land was taken by squatter's right, so much being allowed as one man could occupy, it resulted in a compact line of wooden houses, extending a distance of a quarter of a mile, with only here and there a narrow passage leading from the street to the rear of this line of buildings. The main street was from 30 to 40 feet wide, and followed the trend of the coast, being the upper line of the sandy and gravelly beach. At first all buildings were on the north side of this highway, the beach having been left open, but soon the south side of this thoroughfare was occupied by a variety of structures, and at only few points were roadways left to the water. Farther back on the tundra and on the low bluff overlooking the Snake river, scattering houses were built on so-called streets, which in summer, were quagmires, almost impassable to loaded vehicles.

The water supply of Nome was obtained from two or three shallow wells sunk near the meeting point of tundra and beach, and immediately between the line of buildings and the sea, this water was peddled in old kerosene cans at the rate of fifty cents per five gallons, or else from Snake river, here a sluggish stream affected by the tide, along whose banks the town extended and in whose waters were anchored a goodly number of river steamers and other craft used as hotels, lodging houses and hospitals.

As the tundra is nothing but a mass of moist, dead and decaying vegetation and a little soil, and always frozen at a depth of twelve to sixteen inches, it is easily seen that any filth or contamination thrown upon its surface in winter, would easily find its way into either of these sources of water supply without much purification, and prove a constant menace to the health of the community, as soon as the warmth of summer melted the snow and permitted the flow through this porous mass, into either stream or wells.

The Fall of 1899, found Nome suffering from an epidemic of typhoid fever, imported, beyond a doubt, from Dawson, where the death rate had been from 50 to 60 per week. The number of cases in Nome was variously stated by the physicians who had wintered there, as being from three to seven hundred. No accurate account was kept, but basing an estimate upon the mortality, the number of patients was nearer the former than the latter figures, out of a population of less than three thousand. The poor facilities for treatment, the lack of utensils and disinfectants, the rush and carelessness of a mining camp; the entire lack of sanitary regulations, all favored an utter disregard of hygienic laws; and typhoid as well as other excreta, were thrown broadcast over the soil ready to infect the large inflow of people from the States who were not immune.

During the winter the high price of lumber had prevented the construction of cess-pits and outhouses; dry earth or sand was not obtainable and excreta were deposited promiscuously on the tundra. Nearer the buildings, a screen of four upright

sticks, surrounded by gunny sacking with possibly a soap box, for earth closet, was a conspicuous mark in the landscape. Behind the row of houses constituting the business part of town, there were a few privy vaults, but these, dug in the frozen ground, rapidly filled with water on the approach of summer and overflowed the surface; or in winter their contents rose like stalagmites, to the level of the seat. The only sanitary arrangement were two public closets built on piling over the beach at a point subjected to overflow by high tides; one of these was free, the other demanded an admission rate of three tickets for twenty-five cents. As the early summer was devoid of storms which would carry away this filth, it had accumulated in the free one to an extent as to become unbearable and required the discontinuance of its use. A small wrecked schooner near the barracks was also made a public convenience, until it became a public nuisance, which unfortunately could not be destroyed as it was a subject of litigation and in the hands of the court.

Scavengers were unknown; kitchen and other refuse was conveniently pitched out of doors, and, until the influx of the thousands from the States increased the amount, it was fairly well disposed of by the Malamute dog. Debris of all kinds, straw, old clothes, packing material, was thrown into the puddles in the rear of the line of houses, so as to form paths over the muck and mire. Yards showed an aggregation of tins and bottles, in which solid and liquid food had once been conveyed, nor were they always empty, for in an emergency some had served the uses of a night vessel.

The problem of bringing the camp to anything like a sanitary condition was made more serious by the high cost of labor, material and food supplies. A dollar an hour was the wage of an ordinary laborer; mechanics and skilled workmen, received a dollar and a half; the use of a team was fixed at ten dollars per hour. Lumber ranged from \$80.00 to \$120.00 per thousand; coal, \$40.00 to \$60.00 per ton. Klondike prices were demanded for provisions; restaurant fare being at a rate of twenty-five cents for a cup of coffee; seventy-five cents for

ham and two eggs; beefsteak from \$2.00 to \$5.00 and other articles in proportion.

To further complicate the health conditions, several of the steamers from the States had imported smallpox amongst their miscellaneous cargoes, and as this had been successfully concealed in the case of the "Oregon" until the passengers had been landed, the prospects for a widespread epidemic were more than favorable. Measles and influenza, finding a virgin soil amongst the native population, were decimating its numbers.

Imagine this community of twenty thousand or more adventurers, stretched along the narrow strip of beach between ordinary high tide and the tundra, living in tents or any temporary shelter; half a hundred seagoing vessels in the open roadstead; steam tugs and gasoline launches pulling and pushing lighters loaded with human cargo or merchandise; gangs of men unloading all manner of articles of commerce upon every open bit of beach; horse and dog teams finding their way through the crowded thoroughfares; buildings going up on every hand; a wide open mining camp with every one intent on his own personal affairs and gains, giving no heed to the welfare of others, and you have a picture of Nome at any time in the twenty-four hours.

The military, though in control, had no funds with which to do even the most necessary work of policing the community; nor was there authority to obtain the same by levying tax or tribute, as would be the case were it foreign or conquered territory. Forced labor was out of the question. The small company of Infantry located at Nome barracks, were fully occupied in preserving order, protecting the public, and guarding the property over which contentions as to ownership had arisen, pending the arrival of the court. So the question of bringing the town to a semblance of cleanliness and enforcing the most elementary conditions of sanitation, became one of making each individual owner of property attend to his own premises, first, by a request showing the necessity therefor, that failing, by more arbitrary measures.

A circular was published based on the following recommendations, viz:

1. A thorough cleaning up of all grounds and destruction of all filth and refuse, either by burning or throwing into the sea, should be undertaken immediately, and failure to comply with this will subject the offending parties to arrest and punishment. All rubbish and garbage should be deposited in suitable receptacles for daily removal and destruction. To lessen the amount of this material, it is suggested that all dry substances be burnt in the ordinary cook fires.
2. All privies and cess-pits which are filled within two feet of the surface, should be closed and a layer of quick lime or other disinfectant thrown over the fecal matter, and then dry earth or sand to fill the pit. In future, the disposal of excreta should be by the "dry earth closet system," the boxes to be emptied daily. The excreta of all patients suffering from infectious disease, should be thoroughly disinfected, (quick lime being the cheapest and best agent) prior to their deposit in closet.
3. Six or more closets with a seating capacity of twenty to forty each, according to location, should at once be constructed by the public for general use.
4. The construction of surface drains running direct from the occupied parts of the tundra to the sea at intervals of 200 feet, should be undertaken without delay. These ditches should have a grade sufficient to insure free outflow, especial care being taken that water does not stand in pools; where drains cross roads, they should be protected by suitable culvert. All lateral ditches must be made to empty into direct channels; any intentional obstruction of a drain, will subject the offender to punishment.
5. As the water supply is to a great extent seepage, it is directed that no wells be sunk in ravines or gullies; owing to the greater liability to contamination. All water for cooking or drinking purposes, should be boiled for at least ten minutes, and kept in covered receptacles. If not used in twenty-four hours, it should again be boiled.
6. All decaying meat, vegetables, fruit, etc., should be immediately destroyed.
7. All refuse, if deposited in the sea, should be taken to such a distance as precludes its being cast upon the beach, within the limits of this community.
8. The Sanitary Officer will be promptly notified by the at-

tending physician, of any case of contagious disease occurring in the community. Upon notification, measures will be taken to inform the public, by the display of a red flag, bearing the name of the disease in letters of at least one inch in height, which flag will be continued to be displayed, until removal or recovery of patient and disinfection of premises.

To carry the operation of this circular into effect, the Sanitary Officers, three in number, notified the proprietors of the necessity and best methods of placing premises in hygienic condition, announcing a second inspection in two or three days, to see if work had been properly done. With few exceptions, fair promises were made and hearty cooperation offered, but when again interviewed, the rule was that nothing had been done. One method of procedure now only was open; the offending party was reported to the Commandant as maintaining a menace to public health; the premises were closed and placed under guard, the proprietor having been informed that he could resume business when the nuisance had been abated and the full compliance with instructions had been accomplished.

The effect was instantaneous; three or four examples satisfied the citizens that the military was determined to enforce the orders, and with a cheerful alacrity, the most crying evils were remedied. Each section of the town that was cleaned and placed under better sanitary arrangements, made the labor less arduous, as support to the enforced measures was heartily given by those who had already performed their duty. Soon the inspectors received reports of especially obnoxious places which had escaped on the first rounds, and neighbors vied with each other, not in the cleanliness of their own premises, but in having the other do his share.

The epidemic of smallpox received more especially the attention of the Treasury Department by its representative, Lieutenant Jarvis, U.S.R.M., who had, prior to the arrival of the Department of Alaska Headquarters, placed two steamships in quarantine. A system of visitation to all reported cases of this disease, removal of patient to improvised

hospital, and disinfection or destruction of bedding, clothing and tentage, with the insistence upon vaccination for all not properly protected, who would proceed up the Yukon or return to the States, served to check the epidemic in a fortnight, and but two or three isolated cases were discovered after the middle of July. When it is considered how widespread was the contagium and the promiscuous intercourse, until isolated, between patient and population, the work done is a remarkable example of what may be accomplished if proper authority is given. It is pleasant to note that at all times a hearty cooperation existed between the physicians employed by the two Departments of the Government; those of the Army acting as sanitary inspectors, these of the Treasury as quarantine officers. All were actuated by that high motive of the true medical man, "the securing of the best welfare of the community," and the results were most gratifying.

A fortunate factor to the good health of the community during the Fall and Winter of 1900, was the introduction, early in August, by a private corporation, of pure spring water. For two months, however, the population of "Chechacos" or new comers, had lived under the old conditions of the water supply, and that the germs of typhoid were not absent, is seen by the report of some twenty cases by the end of August. The number later was slightly increased, but never assumed large proportions. When comparison is made in this respect with the second season of Dawson's existence, American sanitary methods will not suffer. American sanitarians have shown that they have fully learned the lesson that whether in the Arctics or in the Tropics, "Cleanliness is the first step to Health."

The work of the Medical Department in North Alaska did not end here. It was stated that influenza and measles had attacked the natives from Cape Vancouver to Cape Prince of Wales. Along the coast and on the islands of Behring sea and up the Yukon, these people were stricken by this pestilence, at a time when they should have been reaping their harvest of fish from the waters. Whole families and villages were

sick at one time, and starvation added to the fearful mortality.

Army doctors with medicines and supplies, visited such villages as could be reached, and ministered to the wants of the stricken Esquimaux; a chartered vessel gathered up such along the coast as could be conveyed to military stations for care and treatment. Burial parties were sent out, and frequently ten or twelve were consigned to one grave. It is estimated that one-third the native population succumbed, and this number would have been doubled but for the assistance of the governmental authorities.

The purely military duties of the Army were not the most trying. Building quarters and barracks, moving stores and fuel, hauling ice and guarding property, during an arctic winter with the thermometer in the 30s or 40s below zero, and arctic gales blowing, are not pleasures; but when you add to this, field work in the shape of constructing telegraph lines, digging through four feet of frozen ground covered by six feet of snow, living in Sibley tents with 50° below zero, as it is away from the coast, helping the dog teams and exhausted mules along the crusted trail sprinkled with blood from the cut hoofs and limbs of your animals; on short rations of beans and bacon; struggling to keep warm during the long wintry nights, to work the harder the few hours of December daylight, you will find that the Service in Alaska is not altogether "coffee cooling," but of that strenuous character that tries one's physical and moral nature. In these hardships, as in all trials of the Line, the members of the Medical Department, commissioned and enlisted, bore their full share, receiving as their reward the consciousness of a hard duty, honestly and faithfully performed.



## TUBERCULOSIS IN THE TROPICS.

By CAPTAIN JOSEPH J. CURRY,

ASSISTANT SURGEON OF UNITED STATES VOLUNTEERS.

**W**HILE text books and special articles, which consider the geographical distribution of the disease, usually state that tuberculosis exists in the tropics in common with all other climates, no mention is made as to what extent the disease prevails here. In considering the most favorable conditions for the development of pulmonary tuberculosis it is generally stated that a cool, moist climate stands first. In fact, pulmonary tuberculosis was long considered to be especially a disease of the temperate zones. This idea was based on a comparatively accurate knowledge of the extent and distribution of the disease in the temperate zones, and a corresponding lack of knowledge as to the nature of the diseases of tropical countries.

It is only within the past few years that the diseases in the tropics have begun to be studied in the same careful and scientific way as have, for the past twenty years, the diseases of the temperate zones.

Among the earlier investigators in the tropics were the English, French, and German military and naval surgeons, and since the Spanish-American War, the surgeons of the U. S. Army and Navy have entered actively into this field of investigation. It is hardly necessary to speak here of the great work accomplished in Cuba by Reed, Carroll, Lazear, and Agarramonte, who composed the Army Medical Commission for the study of yellow fever. Through the discoveries of Surgeons Reed and Ross, we are now able to apply effective preventive measures against those diseases which are transmitted by suctional insects, and recent investigations have thrown considerable light on the nature and the mode of spreading of other important diseases of the tropics.

There is a disease, however, which claims many more victims throughout the tropical world, than malaria and yellow fever combined, and strange to say, this disease has received but scant attention from writers on tropical diseases.

In the Philippine Islands, in Cuba, and in Porto Rico, pulmonary tuberculosis is probably responsible for a greater number of deaths among the natives than any other disease, and I have no doubt this is true also of a great part of the tropics. The malarial fevers are, on account of their debilitating effects and the accompanying anemia, among the most important diseases of the tropics, but their importance has frequently been magnified at the expense of other wide spread fatal diseases, and they have often overshadowed the diseases in which they frequently occur as a secondary, and often as a minor infection.

The manifestations of tropical malarial fever are so varied, that it may resemble, in its symptoms and temperature curve, a great many, diseases. The custom has generally been, in the tropics, to regard all fevers as malarial, unless positively proven to be otherwise. I wish I could impress on the surgeons in the tropics the importance of approaching this subject of diagnosis from the opposite standpoint. Too often on this account, has the diagnosis of malarial fever been made in cases of tuberculosis, of typhoid fever, and of other diseases. In the past, many of our soldiers sick with pulmonary tuberculosis, have been kept in the islands too long, with the diagnosis of malarial fever. I have performed a number of autopsies in Manila on men sent to the hospitals with the diagnosis of malarial fever, and found death due to pulmonary tuberculosis. No doubt many of these men had malarial fever in the beginning of their illness, or later in the course of the disease.

This brings us to the consideration of the causes of these errors of diagnosis in such cases. The first is: that the malarial fevers here, are prone to occur as secondary infections or as exacerbations of an old infection in such more or less chronic diseases as pulmonary tuberculosis; and secondly, it is not

generally understood that pulmonary tuberculosis is a very common disease in the tropics. That pulmonary tuberculosis pursues a very rapid and fatal course in the tropics is well known to those surgeons who have served in Cuba, Porto Rico, and the Philippines. It is well recognized that the only salvation for the patient in this disease is to send him out of the tropics as early as possible.

In Manila, a city of about 250,000 inhabitants, there were reported to the Board of Health, from October 1899 to June 1900 inclusive, 992 deaths from tuberculosis, and 630 deaths from acute lung diseases. This gives a death rate of nearly 6 per 1000, for tuberculosis, and 8 per 1000 for tuberculosis and acute lung diseases. During these nine months there was a total of 8,535 deaths from all causes. Excluding children's diseases, dysentery was responsible for the greatest number of deaths, 1,073. Tuberculosis was a close second with 992, and acute lung diseases third, with 630. In this series, malarial fever was reported as the cause of death in 338 cases, and typhoid fever in 41. Many medical officers serving at various stations throughout the islands, on the coast, and along the rivers, have remarked upon the great prevalence of pulmonary diseases in these places, and one of the most frequent of the causes of rejection of men for the native regiments, is pulmonary tuberculosis. This disease is wide spread among Tagals and the Visayans. The hill tribes and the Moros do not seem to have the disease as generally as the other tribes.

Among the American troops, according to the Surgeon General's report for the year 1900, the rate of admission to hospital for pulmonary tuberculosis in the Philippines, for the year 1898 was 5.95 per 1000 of strength, and in 1899, 4.48 per 1000. The average rate for these two years is over twice as great as the mean annual rate, (2.66,) for the last ten years. In 1899 the rate of admission for pulmonary tuberculosis was 5.10 per 1000 for Porto Rico, and 4.49 for Cuba.

These figures show what a marked increase there has been in pulmonary tuberculosis among the troops since they began to serve in the tropics. The report of the Director

General of the English Army Medical Department for 1899, also shows that the commands serving in tropical countries, have a higher rate of admission for pulmonary tuberculosis than those serving at home and in Canada. The admission rate for the United Kingdom was 3.5 per 1000 of the strength, while in India it was 4.2. Among the non-European (native) troops, the admission rate in the English Army throughout the tropics, is very high. In west Africa the admission rate for these troops for 1899 was 15.2 per 1000. In Jamaica 15 per 1000, and in the Barbadoes 10.7 per 1000. This high rate among the native troops is significant. It shows how wide spread is pulmonary tuberculosis among the dark skinned races. It must be remembered, too, that these high rates occurred among men picked after careful physical examination.

In Havana, tuberculosis is responsible for a higher mortality rate than any city in the United States. As shown in the report for 1901, of Major Gorgas, Chief Sanitary Officer of Havana, the annual death rate from this disease for nine years, from 1890 to 1899, was nearly 8 per 1000. The lowest rate was 6 per 1000 inhabitants in 1896, and the highest, 11 per 1000 in 1898. In marked contrast, the statistics for the year 1901, the third year of the American occupation, shows a rate of but 3.6 per 1000.

It is not hard to understand the reason for this great prevalence and high mortality of pulmonary tuberculosis. The enervating influences of the tropics, and the wide prevalence of such anemiating and debilitating diseases as the malarial fevers and dysentery, lessen the resisting powers of those living here, consequently removing the only force capable of combatting the disease. Then, too, it is very probable, that under such favorable conditions of warmth and moisture, present in the tropics, that the tubercle bacillus preserves its virulence much longer than in other parts of the world. In addition to these influences, the ignorance, which prevails among natives of the tropics, of sanitary laws and of the mode of dissemination of infectious diseases, constitutes a very important factor in the prevalence of tuberculosis here.

## NOTE ON THE UNSAFE CONSTRUCTION OF WATER STERILIZERS.

By F. W. F. WIEBER, M.D.,

SURGEON IN THE UNITED STATES NAVY.

**A**S the operating rooms of our Navy Hospitals and probably also those of many of the Army Hospitals are fitted up with the old water sterilizers as originally furnished, it may not be out of place, in these pages, to call attention to an accident which happened at the Naval Academy Sick Quarters in November last, which but for fortunate circumstances might have resulted in the loss of two lives.

At about 3:15 P. M., on November 24th, 1902, a loud explosion occurred in the operating room during the process of water sterilization; the building shook; steam escaped through broken windows and the door of the room; and an attendant in the operating room was scalded by steam about the shoulders and legs. After the steam had cleared away, the water boiler was seen in the ceiling, and firmly imbedded in the joists of the floor of the room overhead, which is used as a board room and in which a medical board was at that time in session, examining candidates for admission to the Naval Academy. The floor was torn open. The boiler had landed just under the chair of a member of the board, who, fortunately, a few minutes before, had left his seat to do some work in connection with the examination.

On examining the boiler later, it was found that the top of the boiler had been torn open, and that its sides were collapsed, evidently the result of the force of the outrushing steam following the break in the top.

The boiler was originally connected with two water tanks by two sets of circulating pipes, each pipe provided with a valve so that the tanks could be sterilized singly. It had neither water gauge nor safety valve independent of the tanks. To sterilize

the water in a tank, both valves on the respective side should have been wide open. The nurse in charge of the operating room, a man of experience in the work assigned him, stated that he had opened the proper valves; however, there is no doubt in my mind that he had not opened the valves and that he had heated the water in the closed boiler. The superheated and compressed steam made its own outlet.

Had there been a safety valve to the boiler, the accident could not have happened. The water sterilizing apparatus was installed in 1897, and bore the name of Sprague-Schuyler Sterilizer No. 1 Class B. The boiler to replace the old one will be fitted with water guage, steam gauge and independent safety valve.

#### AN APPLIANCE FOR SUPPORTING DISABLED MOUNTED MEN.

THE following support for the disabled is simple, inexpensive, fits all military saddles without any alterations, makes a saddle feel like a comfortable armchair, and will prevent an unconscious man from falling from his saddle when his horse is galloping. A semicircle of light metal, padded inside and leather covered, has two large D's at front extremities and a metal leather-covered upright fixed at right angles to middle of semicircle behind. When the patient has been assisted to his saddle this upright is placed in the crupper D of saddle, a stirrup leather is threaded through the two D's in front and through the middle of the saddle between the wallets, then the strap is buckled. The whole process takes a few seconds only. The weight of the patient is supported partly by the saddle and partly by the ring pulling against the fixture in front; the upright only keeps the ring at a proper height and prevents lateral swaying. A padded head rest can be put above upright with protection from sun. Six of these supports can be carried face downwards on saddle of a spare horse secured by the leather straps, and would be ready at once for use with a patrol.—*Lieutenant Colonel H. Hathaway, R.A.M.C., in British Medical Journal.*

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## Editorial Department.

### THE NEW EPOCH IN THE HISTORY OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES.

THE unanimous passage of the act to incorporate the Association of Military Surgeons of the United States by both houses of Congress and its approval by President Roosevelt marks the opening of a new era in the history of military and naval medicine. From a modest beginning as the Association of Military Surgeons of the National Guard of the United States in 1891, the organization grew by the addition of the medical officers of the army and navy in 1893 to be the unofficial Association of Military Surgeons of the United States which has had so successful and useful a career and which has added so much to the position of American Military Medicine. During the twelve years of its existence the personnel of the Association has been marked by steady growth.

The work brought forth through its influence is now crystallized in the eleven volumes published by it,—nine volumes of Proceedings and two of the Journal. Its influence in developing study, thought and investigation along the lines of military and naval medicine, surgery, sanitation and equipment is amply demonstrated by the increasing bulk of the annual contributions to its publications. It has thus admirably filled its declared purpose, "to promote and improve the science of military surgery."

In course of the development of the Association, however, it became evident that there were points upon which as an unofficial organization it could not touch. Its work was hampered and retarded by the lack of an official status under the law of the nation. While the national and most of the state services recognized it by the detail of official representatives, and while various foreign powers extended to it the courtesy of official recognition, some still stood aloof on account of its unofficial character. This

defect is now fully corrected by the following Act of Congress, approved January 30, 1903 :

[PUBLIC—No. 39.]

An Act To Incorporate the Association of Military Surgeons of the United States.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled*, That George M. Sternberg, of the District of Columbia; Presley Marion Rixey, of the District of Columbia; Walter Wyman, of the District of Columbia; Nicholas Senn, of Illinois; Jefferson Davis Griffith, of Missouri; John Van Rensselaer Hoff, of New York; Robert A. Blood, of Massachusetts; Leonard B. Almy, of Connecticut; Nelson H. Henry, of New York; J. Francis Calef, of Connecticut; George Henderson, of the District of Columbia; Charles F. W. Myers, of New Jersey; John V. Shoemaker, of Pennsylvania; Angelo Fistorazzi, of Alabama; Edmund C. Brush, of Ohio; Frederick W. Byers, of Wisconsin; James T. Priestley, of Iowa; James Evelyn Pilcher, of Pennsylvania; Marshall O. Terry, of New York; Winslow Anderson, of California; Charles H. Alden, of Pennsylvania; William W. Grant, of Colorado; Robert Harvey Reed, of Wyoming; Thomas C. Clark, of Minnesota; Robert A. Marmion, of the District of Columbia; Myles Standish, of Massachusetts; John C. Wise, of Maryland; George T. Vaughan, of Virginia; Albert H. Briggs, of New York; William C. Borden, of New York; Otis H. Marion, of Massachusetts, and their associates and successors, are hereby created a body corporate and politic in the District of Columbia, by the name of the Association of Military Surgeons of the United States, for the purpose of advancing the knowledge of military surgery, medicine, and sanitation in the medical departments of the Army, the Navy, and the Marine-Hospital Service of the United States and of the militia of the different States, and to increase the efficiency of the different services by mutual association and the consideration of matters pertaining to the medico-military service of the United States in peace and in war.

SEC. 2. That the Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, the Surgeon-General of the Army, the Surgeon-General of the Navy, and the Surgeon-General of the Marine-Hospital Service shall be ex-officio members of the Association of Military Surgeons of the United States, and, with the president of the association, shall act as an advisory board to the said association.

SEC. 3. That said Association is authorized to hold real and personal estate in the United States, so far only as may be necessary to its lawful ends, to an amount not exceeding one hundred thousand dollars, and may adopt a constitution and make by-laws not inconsistent with law, and may adopt a seal and an insignia which may be worn by its members.

Approved, January 30, 1903.

The provisions of the Act will require some modifications of the constitution and by-laws of the unincorporated association before it is finally adopted by the new corporation. An additional class of members, "Ex-Officio Members," comprising the Secretaries of the Treasury, War, and the Navy, and the Surgeon Generals of the Army, Navy and Public Health and Marine Hospital Service, must be established; an article of the constitution must be adopted, providing for an Advisory Board; and a by-law must be enacted specifying its functions and conduct.

The last section of the Act officially recognizes the insignia of the Association and authorizes it to be worn by members. This recognition of the insignia by the national government will cause its recognition also by the few states that have not done so. It therefore renders it necessary to incorporate a description of the seal and insignia in the constitution. Hitherto no description of either has been published, and the only reason for uniformity has been that but one seal has been in existence from the beginning and the manufacture of the insignia has been for the same period in the hands of the same establishment. The



design for both badge and button, as hitherto furnished, is admirable and no change is desirable. The proper description of them in an additional article of the constitution will satisfy all requirements.

In all these cases the provision of the constitution of the unincorporated Association prohibiting amendment without a year's notice may be disregarded, since the official corporation established by law is not the same organization but a successor to it. Once adopted, however, all future amendments will have to comply with the article in question.

# Association of Military Surgeons

## Enno Sander Prize.

1902-1903.

The Essayist securing First Place will receive

A Gold Medal,

of the value of

One Hundred Dollars.

The Essayist securing First Honorable Mention will receive

A Life Membership

in the Association, of the Value of Fifty Dollars.



SUBJECT FOR 1902-1903:

## THE DIFFERENTIAL DIAGNOSIS OF TYPHOID FEVER IN ITS EARLIEST STAGES.

### CONDITIONS OF THE COMPETITION.

1. Competition is open to all persons eligible to active or associate membership in the Association of Military Surgeons of the United States.
2. The prize will be awarded upon the recommendation of a Board of Award selected by the Executive Committee. The Board will determine upon the essay to which the prize shall be awarded, and will also recommend such of the other papers submitted, as it may see fit for honorable mention, the author of the first of which shall receive a life membership in the Association.
3. In fixing the precedence of the essays submitted, the Board will take into consideration—primarily—originality, comprehensiveness and the practicability and utility of the opinions advanced, and—secondarily—literary character.
4. Essays will consist of not less than ten thousand, nor more than twenty thousand words, exclusive of tables.
5. Each competitor will send three typewritten copies of his essay in a sealed envelope to the Secretary of the Association, so as to reach that officer at least one month before the next ensuing annual meeting.
6. The essay shall contain nothing to indicate the identity of the author. Each one however will be authenticated by a nom de plume, a copy of which shall, at the same time as the essay, be transmitted to the Secretary in a sealed envelope together with the author's name, rank and address.
7. The envelope containing the name of the successful competitor will be publicly opened at the next succeeding annual meeting of the Association, and the prize thereupon awarded.
8. The successful essay becomes the property of the Association of Military Surgeons of the United States, and will appear in its publications.

BOARD OF AWARD—1902-1903

Brigadier General AUSTIN FLINT, New York.

Colonel CALVIN DE WITT, U.S. Army.

Lieutenant Colonel VICTOR C. VAUGHAN, U.S. Vols.

**Robert Allen Blood, President. James Evelyn Pilcher, Secretary,**  
Carlisle, Pennsylvania.

THE REORGANIZATION OF THE UNITED STATES  
ARMY HOSPITAL CORPS.

**A**N important feature of the Army appropriation bill recently enacted provides for the organization of the Hospital Corps in harmony with other branches of the military service. The titles of Hospital Steward and Acting Hospital Steward are a survival of a period in the history of medico-military organization, when the work of the Medical Department was in its infancy and neither understood nor appreciated. "Hospital Steward" was an appropriate title when the medical officer was addressed by the obsolete title of "Surgeon" or "Assistant Surgeon," but with the emergence of actual military rank and the consequent application of military titles to medical officers, a lack of harmony became apparent between the commissioned contingent and the enlisted men of the medical department. This condition is corrected by the act referred to.

The army hospital corps, under the reorganization, will consist of—

300 First Class Sergeants at \$540 per annum.

300 Sergeants at \$300 per annum,

20 Corporals at \$240 per annum.

1,600 First Class Privates at \$216 per annum,

875 Privates at \$192 per annum.

The First Class Sergeants and Sergeants are respectively the former Hospital Stewards and Acting Hospital Stewards under more appropriate titles.

The Corporals represent a new grade not present in the former organization, although seriously needed. The new grade will, as stated by the Secretary of War, "furnish proper positions for a number of valuable members of the corps who have the capacity to control men and yet very frequently are not sufficiently educated to pass an examination for promotion to the higher grades. Such men would be invaluable in the control of working parties of privates, in policing grounds, caring for transportation, canvas, and many things that are required of the medical department particularly in active service." The Corporals will subserve a most important function also as drill-masters in the companies of instruction.

The division of privates into two classes will contribute materially to the efficiency of that grade, by providing an incentive to the private to do work which will justify his location in the higher class. It will simplify the detail of members of detachments on duty in Hospitals and add essentially to the convenience of administration.

General O'Reilly is to be congratulated upon the success which has crowned his efforts to improve the force under his direction, and the medical department is to be felicitated upon the practical ability and energy of its Chief as shown thus early in his administration.

#### FORWARDING THE JOURNAL BY THE POST OFFICE OFFICIALS.

**I**N a number of instances, complaints have reached the Secretary's office that members have failed to receive their JOURNALS. In some cases this has been due to failure upon the part of the members to notify the Secretary of a change of address. In case of officers of the regular service even this should not have prevented the receipt of the JOURNALS, for Par. 3 of the Postmaster General's order No. 395 provides:

"That all mail matter, whatever its class, addressed to persons in the United States service (civil, military or naval), serving in the United States or its island possessions, or Cuba, or enroute to or from the United States or any of its island possessions, or Cuba, whose change of address is caused by official orders, shall be transmitted as rapidly as possible until it reaches the addressee; that the actual location of the addressee, for the time being, shall be considered as the original destination of the piece of mail matter; that such transmission shall not be considered as 'forwarding' in the sense in which that word is used in the postal service, and that no additional postage shall be required therefor."

While then urging members to promptly notify the Secretary of change of address, it would be well to remember the foregoing order in providing for the forwarding of mail by postmasters at a previous address.

## Reviews of Books.

### THE NEW MANUAL FOR THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY.\*

**M**OST of us well remember the thin black books called the Standard Supply Tables containing about a dozen pages of general directions and thirty or forty of listed supplies. Seven years ago the first real manual appeared, well indexed and comprehensive, and the succeeding editions of 1899 and 1900 showed other development during that period of transition.

The last manual contains 232 pages, and for the first time there is definite provision for the important duties of campaign. In a country which must necessarily depend on large numbers of civilians to supplement its medical department in time of war, the directions under the heading "Medical officers in the field," Par. 17-23, are of much importance.

The paragraphs relating to the hospital corps have been practically rewritten, and for the first time companies of instruction are outlined authoritatively. It is interesting to note that though these companies actually have existed at different times for about ten years, the first organized by competent authority was in the Division of the Philippines May 23rd, 1900, followed by the First and Second Companies November 8th, 1902. The commissioned personnel for both hospital trains and hospital ships is insufficient to properly care for their disabled. Two medical officers cannot attend to 200 sick in addition to other duties. The definite fixing of personnel, tentage, mounts, transportation, supplies and equipment is now done for the first time for field hospitals, ambulance companies, and the detachments serving with various commands. Under the provisions of paragraph 59 there are now (or should be) two fully equipped regimental field hospitals in each department.

The hospital fund is still accounted for in an antiquated and laborious manner, and we can well copy the more common-sense regulations governing that of a company of the line. It is also noted that a strict interpretation of Par. 77 would

\*Manual for the Medical Department. Compiled Under the Direction of the Surgeon General. Published by Authority of the Secretary of War, for use in the Army of the United States. 12 mo.; pp. 232; Washington, Government Printing Office, 1902.

array male nurses in a waist and skirt of suitable white material, bishop collar, and white apron, without which habiliments they would not be allowed in the wards. Thirty-five pages are occupied with directions for reports and returns. and, unless a radical revision and simplification of this subject is made it is safe to prophesy even an increase in the space devoted to it.

The general supply table is more comprehensive than ever before, and too much praise cannot be given to Munson's admirable unit system of packing. The detachment case is still styled "emergency" despite its contents of sulphonal, aloin, brown mixture, calomel, and Dover's powder; while it is questionable whether separate alphabetical lists for furniture, bedding and clothing, stationery, and miscellaneous are longer desirable. It is also noted that the hospital corps pouch contains eight first aid packets while the drill regulations call for six.

As in other parts of the manual the field supply table is modern, definite and business-like. We have yet to see a field register of convenient size, and sheet 2 form 25 has outlived its usefulness for this purpose. The field desk now contains a better selection of blanks, and the tent units are far superior to the older method of issue. The acetylene outfit makes one long for the day when our hospitals shall be free from the burden of oil lamps with their smoke, air pollution, expense and labor, while the twenty-two pages of obsolete (un-uniform?) instruments, appliances and equipment suggest the query as to whether they could not profitably be put entirely out of service.

The index is more complete than ever before, and the paper and printing compares very favorably with this year's foreign manuals. It is believed that the actual quotation of army regulations serves a better purpose than mere reference and the British practice of printing a marginal line wherever there has been a change from the previous edition has much to commend it.

On the whole we have for the first time a manual for war service, one written on broader lines and giving more liberal allowances than that of any foreign army, and one upon which we can still build.

J. S. KULP.



## A SHORT ACCOUNT OF THE RESULTS OF MOSQUITO WORK IN HAVANA, CUBA.

By COLONEL WILLIAM CRAWFORD GORGAS,  
ASSISTANT SURGEON GENERAL IN THE UNITED STATES ARMY;  
LATELY CHIEF SANITARY OFFICER OF HAVANA.

THE Army Board which met in Havana, Cuba, in the fall of 1900, for the study of yellow fever, and of which the late Major Walter Reed was president, demonstrated the mosquito theory, first made known by Dr. Carlos Finlay, and showed conclusively that the mosquito is the only means of propagating this disease.

Early in the year 1901, after the results of this investigation were published, the Sanitary Department of Havana began extensive work for the destruction of the mosquito. At that time, the prospect for yellow fever was very gloomy. It was evident that general sanitary methods would not eradicate this disease in any reasonable time. While the death rate of the city had steadily improved during 1900, yellow fever had been severe; and the same can be said of the preceding year, 1899, the first year of American occupation. After an entire year of work on the most improved sanitary lines, we had one of the worst winter epidemics that had ever occurred in Havana.

At the beginning of 1901, there were in the neighborhood of 40,000 non-immunes scattered in various parts of the city, and yellow fever infection was equally scattered. Even with the truth of the mosquito theory granted, it seemed impossible, under any system of killing mosquitoes, to avoid leaving a sufficient number to carry on the infection. No mosquito work in the Havana houses could possibly destroy all of these insects and a considerable number must always escape; and these, it was thought, would be enough to keep up the infection.

The work was planned more particularly with regard to yel-

low fever, and the idea was, first, to prevent in every possible way the breeding of mosquitoes; second, to prevent the *Stegomyia* mosquitoes from biting yellow fever patients; third, to destroy as far as possible all mosquitoes that had bitten yellow fever patients.

Careful investigation and study of the question showed that mosquitoes were breeding in almost every house in Havana. The water supplied by the city was hard, and almost every family collected rain water for washing purposes. These collections were found to be the particular habitat of the *Stegomyia*. There being no general system of sewerage, every house has a cess-pool of some kind. These cess-pools were great places for breeding mosquitoes.

The city is surrounded by gardens and farms which are irrigated for the purpose of raising vegetables and grasses. These irrigated farms are favorable to the development of mosquitoes, more particularly the *Anopheles*, and as the city has extended, the irrigation ditches have become uncovered sewers. There are miles and miles of such ditches, every square foot of which was breeding mosquitoes. The suburbs are overgrown with grasses and weeds of all kinds.

To meet this condition of affairs, three sets of mosquito workers were organized: the "*Stegomyia* Brigade," for working in the built-up portions of the city; the "*Anopheles* Brigade," for working in the suburbs and neighboring swamps, and the "*Yellow Fever* Brigade," for killing mosquitoes that may have become infected.

For the purpose of systematic work, the city was divided into seven districts. To each district was assigned an inspector and an assistant. The inspector visited every day a number of houses assigned to him for inspection that day. He noted the condition of the houses with regard to places where mosquitoes could breed, and also with regard to the observance of the Municipal Ordinances on the subject.

Early in the year, the Mayor issued an order requiring that everybody having water on their premises should keep it mosquito-proof, and fixed a fine for the non-observance of the ordi-

nance. The assistant accompanied the inspector with a couple of cans of oil, from which he poured about a pint into each cess-pool. If vessels with standing water not protected according to law were found, it was reported to the office and the man fined; and if, on the next inspection, unprotected receptacles were again found, the water was emptied and the receptacle destroyed. This process in Havana has been most successful in its results.

The first inspection showed every house, almost without exception, to have some deposit containing larvæ on the premises. The last inspection of 16,338 houses, made during the month of April, showed only 187 to have larvæ. Personal observation as to the number of adult mosquitoes bears this out. From many houses in Havana they have entirely disappeared, and in nearly all, are very much lessened. The officer in charge of this brigade estimates that there are only about  $\frac{1}{10}$  the number of mosquitoes in the city now that there were at the time systematic work for their destruction was begun, and personal observation would tend to confirm this estimate.

I believe that, practically, in a city such as Havana, the mosquito is bred within the house which he troubles, and that the yellow fever mosquito—the *Stegomyia*—generally breeds in the rain water barrel and receptacle. If this be the case, it can be seen what a great effect the work of the *Stegomyia* brigade must have had. At the beginning of the work, this mosquito had 26,000 different breeding places in the 26,000 different houses of Havana; at the end of a year, in these same houses there were only 258 breeding places. This brigade has continued its work all during the year, the force varying according to the necessity of the case,—the maximum employed being 36 and the minimum 22.

The *Anopheles* brigade was organized for the purpose of looking after the suburbs where a good deal of ditching had to be done. It was found that the larvæ were breeding wherever the ground was irrigated and a hole or depression was left to retain the water. All these farms and grass lands have been ditched and drained by this brigade. All the irrigation ditches and sewers have been cleaned—both the beds and the banks—of grass

and vegetation, the aim of the brigade being to drain everything possible. Such small places as could not be drained were oiled, but the use of oil to any great extent has been found impracticable in the service of this brigade. In the fields and in the grass it could not be spread around in any satisfactory manner, and in the larger pools it would be quickly blown to one side.

There are several square miles of swamp land on the east side of the city, and about a mile distant, between Havana and Guanabacoa, from which Havana is separated by an arm of the bay. No attempt was made to do anything with most of this swamp land. The mosquitoes breeding in these places seldom or never migrate to the city. As far as we can tell, they are no worse on the side of the city next which these swamps lie than in other parts.

The old quarries on the north and west sides of the city gave us considerable trouble. In the largest, a pump has been placed by the Engineer Department and the depression kept dry by pumping. In the other, we found that by digging down to the rock and scraping the earth away, the rock would absorb the water; so that in many places by digging a hole and baring the rock for a couple of yards, we have succeeded in getting rid of the water.

The Anopheles brigade was divided into sections, each section being in charge of a foreman, so that the brigade was generally at work in half a dozen different places. The whole brigade was under the charge of one chief. The force here has also varied as necessity indicated, with a maximum of 87 and a minimum of 14. The work is still being pushed. The suburbs are now being well drained, but as the rainy season comes on, the whole work of last year will have to be gone over and the grass, etc., cleaned out of the ditches.

For killing infected mosquitoes, the yellow fever brigade was organized, the plan being to kill all the infected insects in the suspected house, and on the possibility of some having escaped, to treat contiguous houses in the same manner. Fumigation with pyrethrum powder is used for this purpose. Pyrethrum is not the best mosquitocide, but it injures no fabric and leaves no

odor. It intoxicates the mosquito and brings him to the ground, where he can be swept up and burned. As a great part of the success of any scheme for yellow fever work must depend upon having the cases promptly reported, every effort is made to avoid inconvenience to the physician and people concerned. By using pyrethrum powder you can fumigate a room, kill all the mosquitoes and allow the occupant to come back within a period of two hours. No fabric is injured in the room, and no disagreeable odor is left. We use sulphur wherever there is nothing that can be injured.

When a suspect of yellow fever is reported, the squad goes at once to the house and screens the room or rooms in which the patient desires to be kept. The department has ready-made screens, and the patient is generally screened within two hours after a case is reported. This is done at public expense. The other rooms in the house are carefully gone over; each room is tightly sealed by pasting paper over the cracks, just as is done in the use of formaline, and pyrethrum powder is then burned at the rate of a pound for every 1,000 cubic feet. This makes very dense fumes and will kill most of the mosquitoes; but as a great many of them only become intoxicated and would revive if given fresh air, the room is opened at the end of two hours, and the mosquitoes swept up and destroyed. Every room in the house and all the contiguous houses are gone over in the same way. On an average, 150 pounds of pyrethrum powder are used for each case.

When the case is ended, the rooms which were occupied by the patient are treated in the same way. The clothing is not disturbed, nor is any other disinfectant used. The patient is quarantined to a certain extent, only one door of entrance or exit being allowed in the screened area, and a guard is placed to see that proper precautions are observed in regard to keeping the door closed. The department allows the physician to designate four or five immunes who can visit the patient; and very little restriction is placed upon the taking out of fabrics, bedding, supplies, etc., care being taken to shake those in which mosquitoes might be conveyed.

This system has succeeded beyond our fondest expectations. We seem in every case to have destroyed practically all the infected mosquitoes, until gradually all infected mosquitoes in Havana have been killed, or died a natural death.

Since September 26th we have not had a single case of yellow fever; and I believe that, at the present time, there is not an infected mosquito left in the city, and that Havana will not have any more yellow fever until it is introduced from neighboring towns which may become infected during the summer.

During the summer of 1901, we established a system of inspection, employing men in the neighboring infected towns and on the lines of traffic coming from those towns,—generally selecting natives who knew everybody in their respective towns, and who reported every non-immune coming into Havana. No person who had been in Cuba less than five years, or who had not had yellow fever, was considered immune.

During the period of infection, 1275 non-immunes came into the city from the two or three towns infected, and from this number we got 27 cases of fever. No case of fever was known to have escaped the inspectors. The non-immunes reported by the inspector were seen on the third and sixth days. If they were all right when seen on the second inspection at the end of the sixth day, they were dropped. Of course the large proportion of these 1200 non-immunes merely came into the city for a day and returned to their homes at the end of the day. No restrictions whatever were placed upon the introduction of fabrics and supplies of any kind. The results have been very satisfactory.

This is the first time, far as my information goes, that this system of inspection has ever been used with regard to yellow fever. It is the direct outcome of the mosquito theory. We were convinced that we had nothing to fear from any belongings of the patient, and all that we cared for was to prevent a man from one of these towns being taken sick in Havana and poisoning our *Stegomyia* mosquitoes. The immunes, who made up as a rule  $\frac{1}{20}$  of the population, were allowed to come and go freely, and we believed we could prevent the non-immunes from doing any harm by seeing each of them on the third and sixth days. While some

27 of these non-immunes had yellow fever in the city, we seem to have gotten hold of all the mosquitoes infected by them.

We can not only point out with a considerable degree of accuracy the decrease in the ratio of deaths, but the actual number of deaths caused by mosquito borne disease can be compared before and after our mosquito work. In yellow fever it has been entirely successful. The average number of deaths from this disease for the past thirty years has been 706; for the year preceding our mosquito work, there were 310 deaths, and for the year of mosquito work, only 18. Of these 18 deaths 13 occurred before the work commenced.

While the figures for malaria are not so striking, the results seem to point just as positively toward mosquito killing as the remedial agent. For the past 11 years we had an average of 513 deaths; for the year 1900 we had 344 deaths, and during the year 1901, the first year of the mosquito work, 151 deaths. For the first four months of the present year, there have been only 26 deaths from this disease,

#### SUICIDE AMONG EUROPEAN SOLDIERS.

THE *Matin* has recently published some statistics as to the relative frequency of suicide in Continental armies. Self-destruction is becoming less common in all of them with the single exception of the Russian, in which the annual average of suicides is said to be 133 per 100,000. The proportion is 18 per 100,000 in France, 24 per 100,000 in Italy, 36 per 100,000 in Germany, and 105 per 100,000 in Austria. The different arms of the service commit suicide in different proportions. The Foreign Legion is the most suicidal branch of the French army, with 99 suicides per 100,000, whereas there are only 14 suicides per 100,000 in the Garde Républicaine. In general it appears that the cavalry commit suicide more frequently than the infantry, the infantry more often than the artillery, and the artillery more often than the engineers. In the British army at home the rate is probably about 23 per 100,000, in India the rate is believed to be higher probably about 30 per 100,000.—*British Medical Journal*.

## HOSPITALS AND CHARITIES IN CUBA.

By MAJOR JEFFERSON RANDOLPH KEAN,

MEDICAL DEPARTMENT, UNITED STATES ARMY; RECENTLY  
SUPERINTENDENT OF THE DEPARTMENT OF  
CHARITIES OF CUBA.

**A**T FIRST sight there would seem to be but little in common between the work of the Department of Charities of Cuba and the purposes of this Association, and so it seemed to me when asked by a member of the Committee to furnish a paper on this subject. But when it was suggested that the special and most important duties of military surgeons, as such, are administrative rather than professional, and it is on the administrative side that failure is most apt to come to the medical officer who lacks military experience, it is thought that in the organization, equipment and administration of the 118 institutions embraced by the Department of Charities in Cuba, which included forty hospitals and six training schools for nurses, something might be found of interest, and perhaps of profit also.

Although the principals of modern scientific charity, which is a branch of political economy, and which, while relieving distress, strives to prevent pauperism and to build up character, had little application under the Spanish regime, Cuba was by no means without charitable organizations, and was well supplied with charitable institutions. Every city had its hospitals and its asylums for orphans and for the aged, while the small towns, if not able to support a municipal hospital, joined in the maintenance of district hospitals, embracing groups of neighboring municipalities. The teachings of the established church powerfully stimulated the custom of giving charitable bequests and endowments. These endowments, although greatly wasted by war and by every sort of maladministration, are still very large.

Having supervision of all such institutions was a bureau of



charities, or, to use the more graceful and more appropriate Spanish word, "Beneficencia", which was under the supervision of the Minister of State and Government. The powers conferred upon this bureau by the Beneficencia Law of 1875 were far greater than those possessed by similar bureaus or departments in any of the States of this country or in England. The spirit and intent of the law was highly philanthropic, though not modern, but, as was usually the case in Cuba, the defect was more in the execution of the law than in its construction.

This elaborate machinery was thrown out of gear by the insurrection and Spanish-American war. All the principal hospitals were occupied and used by the military arm. The incomes of all institutions, whether proceeding from public or private sources, diminished greatly, or were quite cut off, and the American military occupation found, in the fall of '98, a chaos of want and suffering that was entirely unrelieved by any organized agency. The destitution of an entire people could only be relieved by a Nation's generosity, and no one who was there can recall without a thrill of pride how liberally the great heart of the American people responded to the cry of distress of Cuba. A flood of supplies,—food, medicine, clothing and utensils,—followed the footsteps of the occupying forces. The Spanish flag had scarcely disappeared from the flagstaff on Morro before there ceased to be hunger in Cuba. In the city of Havana and suburbs alone, 2,251,000 rations were distributed at this time, besides great quantities of clothing, medicine and other supplies.

To be thus the ministers of the Nation's generosity was pleasant work, and it was also an easy task when compared with the more difficult problem which succeeded of how to get the survivors of the Reconcentration back to their homes and their work; how to support them in the country until a house could be built and the first crop gathered, and how to bring to an end the free distribution of rations without causing a widow or an orphan to go hungry. These problems were worked out by the Department Commanders, each in his own way and with his own officers, according to the varying needs and conditions of the different communities, with a degree of patience, tact and skill most creditable to the Army of Occupation.

In the latter part of 1899, an order was issued from Division Headquarters which required Department Commanders in Cuba to make, through their staff officers, inspections of hospitals, asylums, jails and other institutions aided by Insular funds. These inspections as a rule devolved upon the Chief Surgeons of the Departments, who thus became in fact Superintendents of Charities and Correction.

These reports showed a most lamentable condition of disorganization, want and neglect to exist in these institutions, and steps were promptly taken to carry out the recommendations of the inspecting officers, and to better the conditions existing in these institutions.

Much energy and labor was devoted to this work in the various Departments, but it soon became evident that a more centralized and uniform system of administration was necessary.

At the end of the first year of the military occupation, it became evident that the American military occupation would be prolonged until an organized and effective government should be established in Cuba, and General Leonard Wood was selected for the constructive work and came to Havana as Military Governor.

With characteristic promptness, he grasped the difficulties of the situation, and provided for their solution. He saw that the old Bureau of Beneficencia was as valueless for vigorous constructive work as were the rusted boilers and twisted machinery of the destroyed "ingenios" for making sugar, and he determined to put the work of reorganization in the hands of a new and independent department, and to consult in its organization the best expert advice obtainable.

Accordingly, Mr. Homer Folks, the Secretary of the Charities Organization Society, of New York, who has been since selected by Mayor Low to be the Commissioner of Charities of that city, was invited to Cuba to study the situation and assist in the draft of a law organizing the new department. As a result of his labors, in collaboration with those of Major E. St. John Greble, the first Superintendent of the new Department, the Charity Law was published in Civil Orders No. 271, dated July 7th, 1900, and gave to Cuba an organization which is the latest expression of modern scientific charities.

The work undertaken by the new Department was immense in amount, and most discouraging in its complexity and demands on the attention of the Superintendent as to details. The report of the Superintendent of Charities for the year 1900 gives a list of no less than 188 institutions which had been assisted with money and rations since the beginning of the American occupation. Many of these were new institutions which had been created to receive and care for the diseased and miserable survivors of the Reconcentration, and especially the orphans which filled the streets of the Cuban cities. In addition to these there were numerous private institutions whose endowments had failed to produce anything during the war, and the numerous Municipal and District Hospitals, which, under Spanish regime, existed in every town of importance, and which during the war had been used almost solely for military purposes, and had been stripped of instruments and supplies upon the withdrawal of the Spanish troops and left with none of the things needed for the care of the multitude of destitute sick. Everything was chaos and confusion and want.

Into all these institutions, order, system and a standard of cleanliness had to be introduced, and persons of sufficient energy and intelligence found to administer them. Supplies of every conceivable variety had to be purchased by the Department and distributed to the various institutions. Buildings had to be put in repair, proper sources of water obtained, modern and sanitary arrangements for the disposal of wastes had to be devised and introduced. Local needs and local conditions had to be ascertained, and extravagance and speculation guarded against.

Such was the flood of work which poured in upon the Department, and with it a vast correspondence about details of every conceivable variety, mostly in Spanish and written in longhand, and all requiring the attention of the Superintendent.

The disbursements, exclusive of rations, for charitable institutions in Cuba, up to December 31st, 1900, amounted to \$2,184,-232.00. All of this vast amount had to be expended in accordance with the rigid and complex rules for the disbursement of money by the Army, and through agents who, as a rule, were entirely unfamiliar with these rules or with American methods.

In addition to all these complex questions of expenditure, equipment and selection of personnel, the methods and standards of administration for institutions had to be revolutionized and set upon a different and higher plane. Cleanliness, sanitation, exact accountability for money and property, and proper methods of administration had to be taught in many parts of the Island at the same time, and through the medium of a foreign language. Even the fundamental principles and aims of charitable work had to be changed from the mediaeval ideas which were everywhere in vogue in Cuba to correspond with modern principles and methods.

It is very difficult to convey any idea of the change which has been effected in the charitable institutions in Cuba, in three years, to persons who did not see these institutions at the beginning of the American occupation. The writer had in January, 1899, occasion to inspect the Government asylum for the insane at Mazorra. At that time the number of inmates was about 350. More than 50% of the inmates had died during the preceding year, the mortality being due to an absolutely insufficient and improper diet—in other words disease incident to slow starvation. In one of the patios on the male side, were seen a number of cases, apparently not of a violent type, walking about in a state of absolute nudity. The agitated cases in both the male and female departments were locked in small cells which received air and light only through the iron bars of the doors, where all their words and actions were in plain hearing and sight of the milder cases, who spent their days in the patios upon which these cells opened. In very few of the cells of the agitated cases was there any bedding, and those of a destructive type were often without clothing. The only classification made of cases consisted in the locking up of those who were violent. The latrines were simply holes made in the stone flooring, and the odor from them was indescribable and pervaded all the neighboring apartments. The attendants appeared to be entirely ignorant and untrained, and were simply hired servants of the laboring classes. The bathing facilities were so inadequate that it appeared probable that a bath must have been an infrequent event in the life of the

inmates. There seemed to be no effort made at classification or appropriate treatment of the different types of mental disease, nor provision for exercise, employment or amusement of the inmates. They appeared simply to be kept as prisoners in a prison where the sights, sounds and contacts must have been peculiarly unpleasant and injurious to a large number whose conceptions of the comforts and decencies of life were in no way diminished by their mental condition.

This institution is now a well ordered, clean and comfortable home for the insane, where the patients are well fed, clothed and cared for. The attention and nursing is good, and the classification of types and the proper exercise and employment of the patients receive careful consideration. It has now 875 patients, and, on account of the rapidity with which the number of inmates has increased, is somewhat crowded, but it is well administered and is a credit to the Insular Government. The amount of money spent on this institution for all purposes during the Military Occupation of the Island was \$400,826.56. A new water supply, a complete system of water-closets and sewers, abundant bathing facilities for both sexes, a steam laundry and a hospital for acutely ill male patients are among the permanent improvements which have been effected in this time.

The same transformation has taken place in the hospitals, which were formerly, according to a popular saying in Cuba, "only places to die in". They afforded to the sick shelter and food, it is true, and a canvas-bottom cot, where usually they lay in their rags and received the doctor's visit and the rude and mediaeval but not unkindly ministrations of the "practicante" and ward servant. But the clean, sweet wards, the comfortable bedding and snowy bed linen, the quiet, dexterous and skillful nurse, the carefully prepared and daintily served foods appropriate to the sick, and all the strict ritual of modern surgical cleanliness, which are now expected in hospitals, were unknown to those of Cuba.

The working of this revolution has been due to two agencies, the introduction of the female trained nurse, and frequent rigid and searching inspections on the part of the officials of the De-

partment. "Make frequent inspections" was the standing order of the Military Governor, and the energy with which he made personal application of this rule was a powerful factor in raising and maintaining the standards of all institutions.

There were numerous endowed institutions for the care of destitute children in Cuba prior to the Military Occupation, but the object of all these institutions was simply to furnish the child food, clothing, shelter and the rudiments of an education. The dangers of institutionalizing them were not appreciated, and no effort was made to make good citizens of them or teach them self-reliance and self-respect.

In most of these institutions a petition for alms confronted the visitor at the door. No stigma was attached to living upon the alms of others, and pauperism was the natural result.

As stated above, a very large number of new asylums were established in Cuba by the American Red Cross, or private agencies, for the care of the orphan children of the Reconcentrados. These institutions were, as a rule, established without any provision for their future support, which was promptly shifted on to the Military Government.

With the establishment of the Department of Charities, a Bureau for placing children in families was created, and the Department set to work to break up the numerous asylums which had performed their temporary function, and to place the children in the more normal and wholesome surroundings of family life. In the great majority of cases it was found, upon careful investigation, that the child had relatives who were, or, in the year which had elapsed since the war, had become, able to support him. Others were placed in good families, where they were subject to frequent and careful inspection. Others were placed in the Training Schools for Boys and Girls respectively, which were raised to a very high standard of cleanliness and good administration.

In carrying out the policy of the Department, fifteen orphan asylums in the Province of Havana alone were closed in the year 1900. The policy of closing unnecessary institutions, consolidating others, and withdrawing subsidies from private endowed in-

stitutions as soon as they could be made self-supporting, has gone steadily forward until, instead of the 188 institutions which the Superintendent's report shows to have been assisted by the State prior to December 31st, 1900, only 59 appeared upon the last estimate prepared for the months of May and June 1902.

This policy has been attended by great economies to the Government, and by the establishment of sound principles as to the limitations of Government assistance, and has greatly strengthened and improved the surviving institutions. It is believed that no useful private institution has been seriously crippled in its work in carrying out this policy.

The following principles have been introduced into Cuban Beneficencia by the Charity Law of 1900:

It declares its preference for bringing up orphan children, committed to its care, in families rather than in institutions, believing that the institute-bred child, with its affections atrophied, its will undeveloped, and its entire ignorance of the economies and mutual sacrifices of family life, cannot make a good citizen. It adopts the principle that to confine in prison children who have fallen under the penalties of the law, renders their reformation hopeless and confirms them in a criminal life; and it provides that all such children between the ages of ten and sixteen years shall be sent to reformatory schools with an indeterminate sentence which can be terminated by the good conduct and reformation of the child.

It adopts the now well established doctrine of political economy, that subsidies of public money given to private institutions tend constantly to increase in amount, and not only cause extravagance and waste, but dry up the springs of private charity.

As an effective means of raising the standards of hospital work, and for the better care of the sick, as well as to open an honorable and useful career to Cuban women, Schools for Trained Nurses have been established in connection with the principal hospitals on the Island.

It indicates in general terms the proper line of division of charitable work between the State, the Municipalities, and the various agencies acting from private initiative, including in the latter

all religious organizations and charitable associations. The charities assumed by the State under this law are:

1. The care of all destitute children who may be properly committed to it.
2. The charge of all delinquent children between the ages of 10 and 16 years who have been convicted of crimes and misdemeanors.
3. The establishment of State institutions for the care and instruction of deaf, blind and otherwise defective children.
4. The care of the insane, or the supervision of their care if they are treated in private institutions.
5. The proper inspection of all charitable institutions of whatever sort, and the collecting of reports and statistics concerning them.

To the Municipalities are assigned the maintenance of hospitals and dispensaries for the destitute sick, and an asylum for the destitute aged and infirm.

To private associations and persons are left all charitable works such as are not provided for by the State or by the Municipalities. The investigation of individual cases of destitution and their relief, when found not to fall within the classes provided for by public charity, is peculiarly the sphere of private charity.

The most important results accomplished by the Department in the two years and a half since its creation have been:

1. The drawing up of the Charity Law of 1900.
2. The enunciation of sound and modern principles as to the care of dependent children, and the establishment of the system of placing them in families; also the establishment of the reform schools and industrial schools for children.
3. The great improvement effected in the care of the insane.
4. The establishment of schools for trained nurses in connection with the larger hospitals, whereby the standards of hospital work has been immensely raised, the care of the sick vastly improved, and an honorable and useful career of work opened for Cuban women.
5. A radical change has been effected in raising the standard



of cleanliness, comfort and good administration of all charitable institutions.

6. The relations between private charitable institutions and the State have been accurately defined.

7. The principles of accurate and complete accountability for public money and property have been inculcated.

8. Annual meetings of the National Conference of Charities for Cuba have been inaugurated, which will secure the great benefits of collective and organized effort, popular enthusiasm and popular understanding of the true principles of charity work.

Whatever may be the changes which the future may have in store for Cuba, it is believed that the good effects of the sound principles which have been adopted and the high standards which have been established can never be wholly lost.

. . .

#### THE NEW CUBA.

AT A RECENT meeting of the American Academy of Political and Social Science, General Leonard Wood gave an account of the work of the American Army in Cuba. He described the reorganization of the government of the island, the establishment of schools, and the solution of important sanitary problems, concluding that the island "was possessed of a thoroughly trained and efficient *personnel* in all departments; completely equipped buildings for the transaction of public business; the administration of justice was free; habeas corpus was put in force; police courts had been established, a new marriage law, on lines proposed by the Roman Catholic Bishop of Havana, giving equal rights to all denominations, was in operation; the people were governed in all municipalities by officials of their own choice, elected at the polls; trials in Cuban courts were as prompt as in any State in the Union, and life and property were absolutely safe; sanitary conditions were better than those existing in most parts of the United States; and yellow fever had been eradicated from the island."

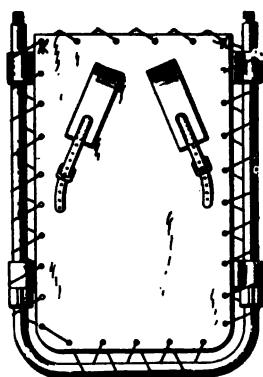
## A NEW FIELD AND NAVY LITTER.

BY C. ALEXANDER CRAWFORD, M.D.

PASSED ASSISTANT SURGEON IN THE UNITED STATES NAVY.

**I**N looking over the subject of litters, now employed both in the field and afloat, one is impressed with their lack of compactness, ease of transportation, and general adaptedness. So far as can be learned, no litter has yet been introduced which is complete in itself with all parts firmly united, and ready for almost instant use, and yet of suitable shape and of sufficient lightness to be carried for hours, like a knapsack, on the shoulders of one man. Nor, does there seem

to be any record of a litter which possesses, in addition to these essentials, the property of being raised and lowered through any hatch, slid along deck or employed, singly or in tiers, as a swinging cot in the sickbay with perfect safety to the wounded.



Litter folded for carrying like a Knapsack. Detail View.

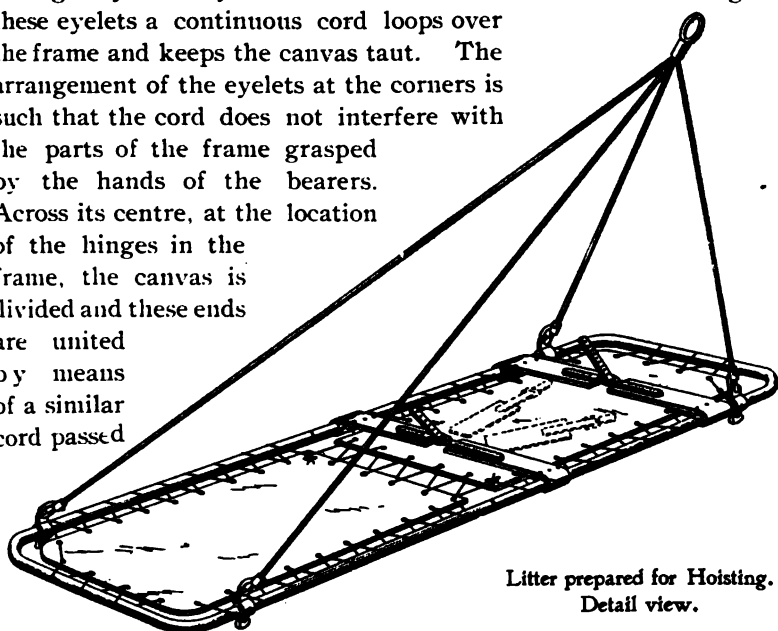
The litter, to be described in this article, has been constructed with a view to combining all these qualities. It weighs less than seventeen pounds; is thirty seven and one-half inches in length when folded, and seventy two inches when extended and ready for occupancy. Its breadth is twenty two inches.

The litter has been constructed on the following lines:

A.—Steel tubing, one inch in diameter, forms the frame. This is six feet in length and twenty two inches in breadth over all. The corners are rounded and serve as handles or as shoulder rests. The tubing is continuous except near the centre of each lateral bar, where a telescopic hinge serves to hold the ends firmly

together when the litter is in use; or, by an easy manipulation allows it to be folded upon itself. Each hinge is thirty five inches from the head of the frame and thirty seven inches from the foot. The telescopic portion of either hinge is two and one-half inches long. When the litter is folded for carrying on the shoulders of one man its total length is thirty-seven and one-half inches.

B.—The body is made of brown canvas and is pierced along its edges by brass eyelets at intervals of three inches. Through these eyelets a continuous cord loops over the frame and keeps the canvas taut. The arrangement of the eyelets at the corners is such that the cord does not interfere with the parts of the frame grasped by the hands of the bearers. Across its centre, at the location of the hinges in the frame, the canvas is divided and these ends are united by means of a similar cord passed



through similar eyelets. This division of the canvas into two equal pieces is made necessary by the telescopic nature of the hinges in the frame.

C.—For securing the occupant, two brown canvas straps, four inches in breadth, are employed. These are securely fastened to the lateral bars and buckle in the centre. The upper strap passes under the arms of the occupant and is attached eleven inches from the end of the frame; the lower passes across the pelvis and is attached to the middle of the frame. When the litter is folded these straps buckle in the opposite direction and

hold the two halves of the frame securely together. Two four



inch adjustable canvas straps, each thirty six inches in length, for carrying the folded litter after the manner of a knapsack, are sewed to the under surface of the head of the canvas. These hold the litter in a comfortable well-balanced position on the shoulders of the bearer and permit perfectly free movement of the arms and legs. Tan leather is used for the ends and for securing

**Litter Prepared for Hoisting. Side view.**  
the buckles of all the straps.

D.—In order that the litter may be adapted to use on board ships in action, an attachment for lowering through hatches has been devised. Four riveted steel bands, with edges raised one inch above and below and each edge pierced by an opening one half inch in diameter, encircle the lateral bars nine inches from the corresponding corners of the frame. For the sake of brevity these four bands will be termed eye-bands. From a steel ring, two inches in diameter, lead four wire cords terminating in snap-hooks which hook through the upper openings in the eye-bands. The cords at the head of the litter are



**Litter Prepared for Hoisting. Front view.**

twenty five inches long and those at the foot, sixty four inches. From any line made fast in the steel ring, the litter is suspended at an angle of about fifty degrees, which approach to the perpendicular greatly facilitates its lowering through any hatch. The lower edges of the eye-bands raise the frame of the litter off the deck and permit one man to slide the loaded litter along the deck by grasping the steel ring of the lowering gear. The upper and lower openings in the eye-bands are used for attaching chains, when the litters are utilized as cots and arranged, one above the other, in tiers. The ordinary naval hammock mattress fits the litter very well and is suit-



Litter Carried as a Knapsack. Front View.



Litter Carried as a Knapsack. Rear view.



Litter Carried as a Knapsack. Side view.

able when it is desired to use the litter as a cot.

E.—The total weight of the litter is less than seventeen pounds. Not more than one minute by actual timing is required by the litter-bearer to remove the folded litter from his shoulders and prepare it on the field or elsewhere for occupancy.

Attention is directed to the fact that the usual projecting handles of other litters or stretchers have been entirely eliminated in this case. The frame tubing near the corners



**Litter Carried by Two Bearers.**



**Litter Carried by Four Bearers.**

serves as excellent handles or shoulder rests, and fits well in the grasp of the hand in bearing the loaded litter up or down hills, hatches, or stairs.

The construction of the body gives a firm but elastic support



The Telescopic Hinge.

to the wounded occupant, and not even a blanket is necessary except for protection against cold and dampness. The telescope



The Telescopic Hinge in Section.

of the hinge cannot slip when the litter is occupied, as the weight of the man firmly binds the invaginated ends of the lateral bars; and slipping is further rendered impossible by the lashings in the centre, between the two pieces of canvas forming the body.

As compared to the "Ames Board," now in use in the Navy, the following points in favor of this litter seem obvious: advantage in weight; greater compactness when not in use; adaptability for landing parties, where it is impossible to use the "Ames Board" on account of its weight and bulk; reduction in the number of straps, and the fact that this litter can be readily used as a swinging cot.

The accompanying drawings illustrate the litter in its several positions, and the photographs show it in actual use in all of these positions, excepting that of a swinging cot. Careful tests made by the Hospital Corps at the Chelsea Naval Hospital, seem to prove its practical efficiency in every position.



## ABSCESS OF THE LIVER.

AN ANALYSIS OF THE CASES WHICH WERE OBSERVED AT THE  
UNITED STATES ARMY GENERAL HOSPITAL AT PRESIDIO OF  
SAN FRANCISCO, CALIFORNIA, FROM JULY 1ST,  
1899, TO JANUARY 1ST, 1902.

By COLONEL ALFRED C. GIRARD,

ASSISTANT SURGEON GENERAL IN THE UNITED STATES ARMY;  
LATE IN COMMAND OF THE PRESIDIO GENERAL  
HOSPITAL OF THE UNITED STATES ARMY.

**A**BSCESS of the liver being a comparatively rare disease and having become a factor of some importance in the nosology of the Army since our expansion into the Tropics, it was thought that the experiences of the General Hospital at the Presidio on the subject would be of value to the Association, and worthy of preservation in its archives and for publication in the JOURNAL, for dissemination among the Medical Officers serving in the Philippines. The method pursued by me at this Hospital, to have a nosological card index with the Hospital numbers of the relative cases, made it possible to segregate from 18,000 clinical histories those cases of liver abscess which either were diagnosed and operated on, or which were only discovered at the post mortem. The work of compiling the data at hand and elaborating the same was done under my direction by Dr. Charles F. Craig, Pathologist to the Hospital, to whom much credit is due for this, as for all the work of like character done by him at this Hospital.

In the period of time embraced between July 1st, 1899, and January 1st, 1902, there have been observed at the U.S.A. General Hospital, Presidio, S.F., Cal., twelve cases of abscess of the liver, all occurring in soldiers. Of these twelve cases, eight were due to the ameba of dysentery, while in four the etiology could



not be determined. Of the twelve cases, four were diagnosed and operated upon successfully, the remainder being discovered at the autopsy. Of the four cases that were operated upon, one was due to the ameba of dysentery and three were of undetermined etiology.

In considering these cases it has been thought best to divide them as to their etiology into two classes, amebic and non-amebic.

#### AMEBIC CASES.

The percentage of cases of amebic abscess of the liver following dysentery observed at this Hospital has been very small. During the time mentioned there have been treated 285 cases of dysentery in which the ameba were found in the feces and which were undoubtedly of amebic origin. This by no means, however, includes the total number of cases of amebic dysentery admitted to the Hospital, as in many cases no examination of the feces was requested, while in others the specimens sent for examination to the Laboratory were not of such a character that the amebæ could have been demonstrated had they been present. From the 285 cases which showed ameba in the feces it will be seen that the percentage of amebic abscess of the liver is remarkably low, only 8 cases having been observed in a total of 285 cases of amebic dysentery.

ETIOLOGY: Kartulis, in 1887, was the first observer to note the presence of ameba in the pus and walls of abscesses of the liver occurring in patients suffering from tropical dysentery, and his observations were soon confirmed by Osler, Councilman, La Fleur, Kruse, Pasquale and numerous other investigators. The large number of investigations which have been carried on regarding the etiological relationship of the ameba of dysentery to abscess formation in the liver have conclusively proven the statement of Kartulis that the ameba of dysentery is capable of and often does produce abscess formation in the liver. The percentage of cases of tropical or amebic dysentery which present abscesses of the liver has not been definitely ascertained, but from the consideration of a large number of cases reported by different observers it has been found that the average is generally 1 to 6, that is; of every 6 cases of amebic dysentery one will show abscess of the

liver. This percentage is either very high or else the cases of amebic dysentery observed at this Hospital are very exceptional, as so small a number of cases showing abscess of the liver have been observed.

The question of the occurrence of other micro-organisms in abscess of the liver and their étiological relation thereto is one which has been by no means settled. Councilman and La Fleur believe that the amebæ alone cause the abscess formation, while other authorities, notably Kruse and Pasquale, believe that the amebæ and the micro-organisms associated with them work together in the production of the pathological lesions. Of the eight cases which have been observed here 7 came to autopsy, and examinations made of the scrapings from the abscess wall and from the contents of the abscesses showed invariably numerous micrococci, principally staphylococci and streptococci. As these are the pus producing organisms in other localities where they may become lodged, it is but reasonable to suppose that the large number encountered in the examinations made of seven cases which are here recorded would have much to do in producing the lesions found. It is a well known fact that these organisms are capable of producing abscesses in the liver and other organs, and it is but reasonable to suppose that when associated with the amebæ they would aid in the production of abscess formation. It is undoubtedly true that the amebæ also are capable alone of producing abscess formation, but when the two are associated it would seem almost preposterous to believe that the amebæ only acted while the other organisms present remained quiescent.

As to the etiology then of these amebic abscesses of the liver, we believe that they were produced by the combined action of the amebæ and of the micrococci associated therewith.

**PATHOLOGICAL ANATOMY:** In considering the pathological anatomy of the cases it has been thought best to give in detail the appearances found at autopsy in the liver and intestines, and a general summary of the microscopical pathology as shown by sections of the diseased organs.

*Case 1. Hospital No. 4189.* Upon opening the abdominal cavity the diaphragm was found adherent to the liver over the entire right lobe. The portion of the diaphragm which is adherent

covers a portion of a large abscess in the right lobe which has ruptured into the right pleural cavity, filling that cavity with greenish pus streaked with brown. There is also a localized cavity existing between the diaphragm and the liver over a portion of the left lobe, which is filled with pus. The liver is enormously enlarged, measuring 32x28 cm. Externally it appears somewhat congested in places. The capsule is smooth, and near the center of the left lobe there is a yellowish area which is due to the presence of an abscess covered by the capsule only. Upon section of the organ, the right lobe is found to contain five abscesses, the measurements of which are as follows: the largest  $8\frac{1}{2}$  cm. in diameter, the next 8 cm., the next 8 cm., the next 7 cm. and the last 3 cm. All these abscesses were found to contain greenish yellow pus much blood-stained. The left lobe of the liver contains an abscess cavity 4 cm. in diameter at its extreme border, and three other abscesses measuring respectively  $3\frac{1}{2}$  cm., 2 cm. and 1 cm in diameter. All these abscesses were filled with pus of the character described. The largest abscess has ruptured into the right pleural cavity. The weight of the liver is 2875 gms.

*Lungs:* The right lung is bathed with pus over its entire surface, but the organ itself is normal upon section.

*Intestinal Canal:* The rectum and sigmoid present numerous small ulcerations, irregular in shape and covered with necrotic membrane. Above these, for a distance of 20 cm., the mucous membrane appears normal, except for a few small ulcerations of the character described. Above this area for about 6 cm. there are several large irregular ulcerations, penetrating to the muscular coat, with raised edges, slightly undermined and covered with necrotic membrane. The floor of the ulcerations is formed by the muscular coat and is covered by congested patches of still intact mucous membrane. From this region to the valve there are numerous ulcerations of the same character, extending in most instances to the muscular coat. The ilium shows numerous patches of congestion but no ulcerations. The condition present is typical of amebic dysentery.

*Case 2. Hospital No. 5119. Liver:* The liver measures 30x25 cm. The organ is of a dark purplish red color externally, the capsule being smooth. Upon the right lobe there is visible an external yellowish area 2 cm. in diameter, which, upon section, proves to be an abscess containing brownish pus. Upon the inferior surface of the right lobe of the liver there is a large abscess measuring 8 cm. in diameter, filled with greenish pus. Upon section of the organ numerous abscesses are opened, the largest 4 cm. in diameter, the smallest microscopical in size. The weight

of the organ is 2050 gms. No rupture of any of these abscesses has occurred.

*Intestinal Canal:* The entire large intestine is a mass of necrotic tissue. Externally the color varies from a light yellowish to black. But few individual ulcers can be distinguished. These are irregular in shape, have undermined edges, the floor covered by shreds of necrotic tissue and formed by the muscular coat of the intestine. Some of these ulcerations communicate with one another beneath the mucous membrane. These ulcerations vary in size, the largest entirely encircling the gut, the smallest being about  $\frac{1}{2}$  cm. in diameter. Where the ulcerations cannot be distinguished, the mucous and sub-mucous coats are simply masses of necrosed tissue bathed with greenish pus. There are two perforations of the large intestine, one at the splenic flexure and one at the hepatic flexure. In some places the coats of the intestine are thickened, in others the ulceration has extended to the peritoneal coat. The ilium is free from ulceration. The conditions present are typical of amebic dysentery.

*Case 3. Hospital No. 5517. Liver:* The liver measures 33x28 cm. Weight 2690 gms. The organ is a dark purplish red color externally. The capsule is smooth. Half of the left lobe is occupied by an immense abscess which measures 12 cm. in diameter and has ruptured into the left pleural cavity. It is filled with dirty greenish pus. The remainder of the left lobe is filled with small abscesses and a greatly increased growth of fibrous tissue. The anterior surface of the right lobe is occupied by two abscesses, the larger one measuring about 8 cm. in diameter, and the smaller 5 cm. Both are filled with a dirty, brownish pus. Upon the upper border of the right lobe there is another abscess cavity measuring 8 cm. in diameter, filled with dirty, greenish pus. The gall bladder contains minute quantities of very pale bile. The abscess which has ruptured into the left pleural cavity has also emptied into the pericardial cavity, which is found filled with pus. The visceral layer of the pericardium is very greatly thickened and covered with shreds of fibre. Upon examination of the heart it is found somewhat hypertrophied but otherwise normal.

*Intestinal Canal:* The entire large intestine is covered with numerous irregular ulcers, most of which have penetrated to the muscular coat. These ulcers are all undergoing healing, many of them showing nothing but a cicatrix. Those which are most acute communicate often with one another beneath the mucous membrane. The ilium shows no ulceration. The condition present is that found in amebic dysentery.

*Case 4. Hospital No. 5260. Liver:* Two large abscesses are found situated upon the upper portion of the liver, nearly in the region between the right and left lobes. Both of these abscesses have ruptured and contain much dirty greenish pus. The larger measures  $7\frac{1}{2}$  cm. in diameter, the smaller 5 cm. Upon section of the liver it is found to contain 11 large abscesses, besides those mentioned, the largest measuring 10 cm. in diameter. The walls of these abscess cavities are formed by necrotic tissue, and the abscesses are filled with dirty, greenish pus.

*Intestinal Canal:* The entire large intestine is thickly studded with large irregular ulcerations, most of which penetrate to the muscular coat. The floor of these ulcers is covered with shreds of necrotic membrane. The edges are slightly undermined and greatly raised above the floor of the ulcer, and are covered also by necrotic membrane. The intervening mucous membrane appears little inflamed and in some places almost normal. At the valve there is a large ulcer, which nearly encircles it, of the same character. The mucous membrane of the small intestine appears fairly normal. The condition present is typical of amebic dysentery.

*Case 5. Hospital No. 5646. Liver:* The liver measures  $34 \times 28$  cm. The organ is greatly enlarged, dark purplish in color externally with yellow mottlings, and the capsule is smooth. The organ weighs 3460 gms. Upon section of the organ it is found to contain 8 large abscesses, the largest 10 cm. in diameter, the smallest 4 cm. These abscesses are filled with brownish yellow pus.

*Intestinal Canal:* The entire large intestine shows the cicatrices of a large number of ulcerations, but there are no ulcerations present in an active condition. The small intestine shows a severe chronic enteritis. In this case the amebic dysentery, which has undoubtedly been present, had healed.

*Case 6. Hospital No. 9027. Liver:* The diaphragm is adherent to the liver over the left lobe. Upon separating it a large abscess cavity is found in the liver which is filled with greenish brown pus. This abscess has perforated into the lower portion of the pericardial cavity, which is also filled with pus, and into the left pleural cavity. The abscess measures 12 cm. in diameter and involves nearly the whole of the left lobe of the liver. The right lobe is very dark, purplish red in color and the capsule is smooth. Upon section of this lobe no abscesses are found. Upon section of the abscess in the left lobe, the wall is found from  $\frac{1}{2}$  to 1 cm. in thickness, showing that this abscess is of long duration.

*Intestinal Canal:* The entire large intestine shows numerous ulcerations varying in size from a pinhead to those measuring 1 cm. in diameter. Most of these ulcerations are in a healing condition. There is but little congestion of the mucous membrane in the vicinity of these ulcers, but just below the valve, where the ulcers are most numerous, they are found to be also most acute. In this region the ulcers penetrate to the muscular coat in one or two places. The condition present is that typical of amebic dysentery.

*Case 7. Hospital No. 6587. Liver:* The organ measures 30x18 c.m., and weighs 1750 gms. It is light purplish red in color externally, with large yellow mottlings scattered over it. Upon the right lobe, situated centrally, there is a large discolored area measuring about 4 c.m. in diameter and depressed about  $\frac{1}{2}$  c.m. Upon section of the organ over this depression, a small area measuring  $\frac{1}{2}$  c.m. in diameter is cut across, the contents of which are undergoing caseation. This area evidently marks the site of an abscess. There are no other abscesses present in the organ.

*Intestinal Canal:* The entire large intestine is covered with irregular ulcerations having clear, notched edges, most of them penetrating to the muscular coat. Many of these ulcerations communicate with one another beneath the mucous membrane and by channels through it. The floor of the ulcers is formed with necrotic membrane, and the mucous membrane between the ulcerations is in most places undergoing necrosis. The intestinal walls are much thickened, the mucous membrane of the small intestine appears normal. The condition present is that typical of amebic dysentery.

In describing the pathological lesions found in these cases the character of the abscess wall has not been touched upon, as it was the same in all the cases and would have been but repetition. In the smaller abscesses the abscess wall, after the pus had been evacuated, presented a shaggy appearance, due to fragments of necrosed tissue scattered over it. In the larger abscesses the shaggy appearance is not so pronounced, the abscess walls being very much more fibrous in character and sometimes very thick. The appearance presented by the wall of an abscess due to ameba is almost characteristic, the peculiar stringy appearance due to necrosis of the tissue in irregular areas and in varying amount giving the abscess wall the rough, shaggy appearance which is always found.

**MICROSCOPIC PATHOLOGY.** The appearances found by an examination of sections of the liver abscesses by the microscope vary with the age of the abscess. In the very small, microscopical abscesses the condition found is that simply of a collection of leucocytes and connective tissue cells, with some congestion of the capillaries in the vicinity, and by careful staining amebæ can sometimes be seen, but not as a rule. In abscesses which have a well defined wall the center of the abscess cavity is generally filled with necrotic epithelium and leucocytes, together with bacteria and more or less caseous material. In the wall of these abscesses ameba may sometimes be demonstrated, but never where the fibre is well marked. The liver cells in the vicinity are undergoing necrosis and the bile ducts and capillaries are congested, the bile ducts often being either obliterated or encroached upon by the rapidly growing connective tissue. In the larger abscesses which have a rather thick wall, sections through this wall will show more or less necrotic material toward the abscess or innermost part, while externally the fibrous tissue is very marked, the appearance presented being that of a layer of granulation tissue, the cells of which are mostly uninuclear, while most externally is a layer of fibrous connective tissue, infiltrated with spindle cells and small, round connective tissue cells. This infiltration with cells varies according to the age of the abscess. Where the fibrous wall is very thick the cellular infiltration is not as great as in those cases where the fibrous tissue is of earlier formation.

In the portion of the abscess wall which encroaches upon the liver tissue within the outermost portion the liver cells are very much distorted in shape, and undergoing necrosis in some places. Still further out there is found a condition of fibrosis, small areas of fibrous tissue encroaching upon the liver substance, generally the fibrous tissue situated between the lobules compressing the cells and in many places distorting them. The capillaries in this region are generally engorged with blood, and small capillary hemorrhages are common.

Throughout the liver substance surrounding the abscess there is generally present a chronic venous congestion due to encroachment upon the capillaries by the fibrous tissue.

In these large abscesses it is almost impossible, as a rule, to demonstrate ameba in the abscess wall. A peculiar condition

present in the liver where large abscesses are present is a localized necrosis of the liver cells around the central vein of the lobules. This condition is probably due to some poisonous material which is liberated during the process of abscess formation.

In all the cases which are here recorded ameba could be demonstrated in the abscess walls, thus showing the nature of the lesion.

*Examination of Abscess Contents.* Microscopical examination of the pus from the smaller abscesses showed numerous flat corpuscles, degenerate liver cells, shreds of necrotic tissue, leucocytes, various micro-organisms, chiefly micrococci, and ameba. Examination of pus from the larger abscesses showed no ameba but many leucocytes, a few degenerated liver cells, much necrotic material and various micro-organisms, chiefly staphylococci and streptococci.

*Examination of Feces.* In cases 2 and 3 the feces were not examined, as a request for such examination was never made. In cases 1, 6 and 7, examination of the feces showed numerous ameba; while in cases 4 and 5, examination of the feces was negative. In case 4, the feces were examined but once, while it is interesting to note that in case 5, the ulcerations of the intestine had healed, which probably accounts for the negative result of the examination of feces.

#### ANALYSIS OF THE CLINICAL SYMPTOMS PRESENTED BY THE CASES OF AMEBIC ABSCESS OF THE LIVER.

*Fever:* Of the eight cases of amebic abscess of the liver, five presented a rise in temperature. Of these five, two showed an intermittent temperature accompanied by slight chills, the highest point reached in the temperature curve being 103° in both. In these cases the temperature was not continuous, there being periods of several days in which the temperature was normal, after which there would be a slight chill accompanied by a rise of temperature, which would be intermittent, for a short period of time, this being succeeded by a period of normal temperature. Two of the cases presented a marked remittent temperature of low type, the highest point reached being 101½°, and persisting for from seven to ten days, when a short period of normal temperature would intervene. One case showed a remittent temper-



ature which was remarkable because of its height. For a period of two weeks this case presented a temperature between  $99\frac{1}{2}$  and  $104\frac{1}{2}$ ° F., the temperature most of the time being above 103°. The case was considered one of typhoid fever, and sponge baths were given. An examination of the feces showed the ameba and autopsy showed the lesions of amebic dysentery. All of the fatal cases, seven in number, showed a fall in temperature just before death, of from two to three degrees, the lowest temperature just before death being 96°, the highest 100°. The temperature of these cases does not differ materially from numerous cases of amebic dysentery which do not show liver abscess. Where the temperature was remittent, the remission occurred in the morning, the highest point being reached about 6 o'clock in the evening.

*Pulse and Respiration:* All the cases showed an acceleration both of the pulse and respirations, the pulse ranging, as a rule, from 80 to 105, the respirations from 18 to 35. Just before death the pulse, in all cases, became very rapid, small and of poor volume. This was also true of the respirations, which became more rapid and very shallow.

*Cough and Expectoration:* Cases showing perforation into the pleural cavity, as well as into the pericardial cavity, presented severe cough and the expectoration of purulent material.

*Jaundice:* All of the cases showed a marked degree of jaundice. This is rather exceptional, as jaundice is only occasionally present as a rule.

*Sweating:* In the clinical notes of the cases of amebic abscess of the liver, only in two cases is sweating spoken of, and in neither of these was it noted as being excessive.

*Pain:* According to all authorities who have studied amebic abscess of the liver, pain is said to be one of the earliest and most prominent symptoms. According to these authorities the pain may be dull or sharp and lancinating and varying in site, being most prominent either in the epigastrium, the right hypochondrium, the axillary space or radiating around the shoulder. In none of the fatal cases of abscess of the liver observed here has pain been at all a prominent symptom. The fact that these cases were not recognized until they came to autopsy, although they

were examined carefully before death, and in several of the cases amebic abscess suspected, is proof that they were not accompanied by any marked degree of pain. None of the clinical histories of these cases speak of the patients suffering pain in any of the regions mentioned. This would seem to show that the symptom of pain cannot be relied upon as much as some authorities would have us believe.

*Anorexia* was present in all the cases, but as this is a common symptom of dysentery, it cannot be considered at all characteristic of abscess of the liver.

*Physical Signs:* In the seven fatal cases there were no physical signs sufficient to admit of a diagnosis of amebic abscess of the liver. In most of the cases the liver was stated to have been slightly enlarged, but there were no tender areas present, despite the fact that some of these cases showed enormous and numerous abscesses. It seems remarkable that an organ riddled with abscess cavities, such as was present in some of these cases, should have shown so few physical signs, thus making the diagnosis so uncertain. As these cases had all suffered from amebic dysentery and gave a clear history of such attacks, it will at once be seen how slight must have been the symptoms that abscess of the liver was not recognized.

Of the eight cases of amebic abscess of the liver, seven proved fatal and one was operated upon. This case was the only one which was diagnosed before death and an operation was performed which proved successful. The following is a brief history of the case:

*Case 8. C. C. D., Discharged Soldier.* Patient was admitted to Hospital Nov. 5, 1899, with a history of having had chronic dysentery for several months. Since about September 1st he had had pain in the right side of the abdomen, in the region of the liver, severe and cutting at times, but mostly of a dull, aching character. After admission to Hospital there was an irregular fever with temperature ranging between 98° and 102°, pulse 100 and gradual loss of flesh and strength. There was marked dullness on the right side of the abdomen, tenderness over the liver, dullness extending about 5 cm. below the border of the last rib. Diagnosis of abscess of the liver was made and operation decided upon.

The operation was performed on Dec. 8, 1899. An incision

was made through the abdominal wall to the outer side of the right rectus muscle over the area of dullness. This incision opened directly into a large abscess cavity situated in the right lobe of the liver. About 600 c.c. of thick, bloody pus was evacuated and the cavity irrigated with normal salt solution. Glass drainage tube was left in the wound and gradually shortened until it was removed. Patient recovered without any complications.

Since recovery patient has been on duty at this Hospital and has suffered several times from exacerbations of the amebic dysentery, the feces showing numerous ameba during each exacerbation, but there has been no recurrence of the liver symptoms.

#### NON-AMEBIC CASES.

There were four cases of abscess of the liver in which the etiology could not be traced. Three of these cases were operated upon successfully, and one came to autopsy. This latter case was not recognized before death. In describing these cases the one fatal case will be first considered.

*Case 1. T.J.F. Hospital No. 4416. Pathological Anatomy:* Upon opening the abdominal cavity the liver was found to measure 24x21 cm. At the superior border of the right lobe there was a large abscess cavity measuring 5x6 cm. This cavity was filled with very bright green pus. This was the only abscess present in the liver, the remainder of the organ appearing to be fairly normal.

*Intestines:* The large intestine throughout the entire length was covered with ulcerations, irregular in shape, completely healed. The base of all these ulcers was much pigmented, and they were arranged along the mesenteric attachment. The mucous membrane between the ulcerations was in fairly normal condition. The mucous membrane of the small intestine showed numerous congested areas.

From the condition found in the intestine in this case, it is probable that the abscess in the liver was due to the ameba, but no amebæ were found in the pus, nor did the walls of the abscess cavity present the appearances characteristic of amebic abscess. The pus showed immense numbers of strepto- and staphylococci.

*Microscopical Pathology:* Sections through the wall of the large abscess showed it to consist of dense fibrous tissue very thinly infiltrated by leucocytes; the inner border of the wall, or that lying next to the cavity, was almost smooth, there being no masses of necrotic tissue such as are so common in this condition of the amebic abscess. There were a few microscopical abscesses

scattered throughout the sections, presenting a center composed of necrotic tissue surrounded by immense numbers of leucocytes and some proliferating connective tissue cells.

ANALYSIS OF THE CLINICAL SYMPTOMS IN THE NON-AMEBIC CASES.

*Fever:* The three cases of non-amebic abscess which were operated upon all presented a rise in temperature. The temperature curve in these cases was that of a remittent fever, accompanied by slight chilly sensations. The fever oscillated between normal and 101°. In the fatal case the highest point in the temperature curve was 99°. This occurred only on two isolated occasions, the temperature for the rest of the time being normal. The patient was in the Hospital for five months before death.

*Pulse and Respirations:* The pulse and respirations in the three cases operated upon were accelerated. In the fatal case the pulse and respirations showed nothing of interest.

*Cough and Expectoration:* In none of these cases was there any cough or expectoration. This was probably due to the fact that in none of them the abscess of the liver had perforated into the pleural cavity.

*Jaundice:* All of the cases showed a slight jaundice, the skin being of a pale, yellowish hue.

*Sweating:* None of the clinical histories of these cases speak of sweating as a prominent symptom.

*Pain:* In the fatal case there was no pain present, so far as the clinical records show. In the other three cases which were operated upon, all presented pain and tenderness over the region of the liver. The pain in all these cases is described in the clinical records as being intermittent in character, dull and aching.

*Anorexia:* Anorexia was present in all the cases.

*Physical Signs:* In the fatal case there were no evidences of abscess of the liver, so far as the physical signs went. Of the three cases which were operated upon, one presented a fluctuating tumor in the right hypochondriac region, which was only slightly tender. The other two showed considerable enlargement of the liver and tenderness upon pressure over the right lobe. Inspection did not show any increase in the dimensions of the chest wall, save in the case which presented the small tumor.

The following is a brief history of the cases of non-amebic abscess of the liver which were operated upon:

*Case 2. S.A., Private, Battery "L," 3rd Artillery.* Patient was admitted to this Hospital on December 11, 1900, from the Philippine Islands, and was found to have a small, fluctuating tumor upon the right side of the abdomen. This was only slightly tender and gave very little discomfort. He gave a history of having had malaria in the Philippine Islands, but said that he had never had dysentery or diarrhea. After a few days the tumor was found to be increasing slightly in size, and he had some rise of temperature in the evening. There was no jaundice or disturbance of the bowels.

Operation December 25, 1900: An incision was made over the most prominent part of the tumor in the abdominal wall just below the margin of the ribs. Quite a large amount of pus was found which was apparently confined to a localized area between the muscles. The discharge from the wound, however, was very profuse during the next few days, and while the wound was being dressed, about a week after the operation, a small sinus was found just below the margin of the ribs, leading beneath the abdominal wall. This was enlarged and found to communicate with a large abscess cavity involving the lower portion of the right lobe of the liver. This cavity was irrigated and drained, and the patient made a rapid recovery, being discharged on February 26, 1901, in good condition, the wound entirely healed.

*Case 3. E.J.O.N., Private, Co. "K," 42nd Vol. Infantry.* The patient was admitted to this Hospital on March 1, 1901, complaining of pain over the region of the liver and the lower portion of the right chest. This pain had been present since December, 1900. There was some evening temperature daily and a slight cough. Upon auscultation, the lower portion of the right chest was found flat and the voice and breathing sounds absent. He gave a history of having had dysentery in the Philippine Islands in July, 1900. Examination of the sputum for tubercle bacilli gave a negative result. An aspirating needle, introduced in the eighth interspace in the posterior axillary line withdrew bloody pus.

Operation March 20, 1901: About two inches of the eighth rib was removed in the posterior axillary line. Immediately beneath this was found an abscess cavity about the size of a large orange, filled with thick bloody pus. This was shut off from the pleural cavity and extended along the diaphragm for some distance. It was thought that it communicated with the upper surface of the liver, although no opening could be found. The abscess cavity was irrigated and a drainage tube inserted. After the operation the wound healed readily and the patient was dis-

charged from the Hospital on April 22, 1901, with the wound entirely healed.

*Case 4. H.S., Private, 28th Co. Coast Artillery:* Patient was admitted to this Hospital on March 13, 1901, complaining of pain and tenderness over the right side of the abdomen. The patient was a recruit and had never been outside of the United States. He stated that these symptoms had been present for about a month. The bowels were constipated and there was an evening rise of temperature. He denied ever having had dysentery or other serious illness prior to the onset of the symptoms mentioned.

Operation March 22, 1901: An aspirating needle was introduced into the right side a little below the margin of the ribs, and revealed the presence of pus. An incision was made through the abdominal wall at this point, and a large abscess cavity opened, which extended upward beneath the lower surface of the liver and involved the right lobe. This cavity was irrigated and a drainage tube inserted.

Improvement was rapid after the operation and the patient was discharged from the Hospital, the wound being entirely healed.

#### CONCLUSIONS.

From the study of these twelve cases of abscess of the liver the following conclusions may be drawn:

1st. Amebic abscess of the liver occurred in a very small percentage of the cases of amebic dysentery observed at this hospital.

2nd. The recognition of cases of amebic abscess of the liver is by no means easy, as of the eight cases observed here, only one presented any clinical symptoms which could not have been referred to the accompanying dysentery.

3rd. Abscess of the liver may occur without the action of the ameba of dysentery.

4th. The symptoms presented in non-amebic abscess of the liver do not differ materially from those in the amebic cases, but in the cases observed at this hospital those of non-amebic character seemed to have presented symptoms of more severity, as a so much larger percentage of these cases were recognized.

5th. Operation in well selected cases of abscess of the liver may be expected to be followed by success where the abscesses are not multiple. As shown in the post mortem findings of the amebic abscess cases, operation would have been of no benefit to the patient in those which presented multiple abscess of the liver.

## GONORRHOEA FROM THE STANDPOINT OF THE NAVAL SURGEON.

By SHELDON GUTHRIE EVANS, M.D.

SURGEON IN THE UNITED STATES NAVY.

IT might seem that an apology is called for in presenting the hackneyed subject of gonorrhœa to this Association, but it has occurred to me, of late, that the amount of time lost to the Services through this disease has been very great and too little attention has been paid to its management and treatment. It is so frequently looked upon as a trivial ailment, requiring inactive treatment, and as a result, we have the many complications presenting themselves, and not infrequently the seeds are sown for more serious trouble in after years, absolutely incapacitating the man for active duty, and thus the services of a good soldier or sailor are lost. Particularly, has this been brought to my mind, by the number of men invalided from the Navy and Marine Corps, by reason of gonorrhœal arthritis and other complications and sequelæ of gonorrhœa.

The management and treatment of this disease is, by no means a simple matter. I was struck by the remark of a Medical Officer not long since who described it as "the most difficult and insubordinate of all diseases that it had been his pleasure to treat in the Naval Service." and I think we can all agree with him, for one can never be certain when a cure has been effected. In regard to my remarks concerning the great loss of time from Gonorrhœa and its complications and sequelæ, permit me to quote a few figures compiled from the last report of the Surgeon General of the Navy. In investigating the subject I have considered only those cases that are almost certain to have been caused by the infection of the gonococcus, namely, Arthritis Gonorrhœica, Balanitis, Cystitis, Ophthalmia Gonorrhœica, Orchitis, Epididymitis, and Stricture of the Urethra; omitting Urinæ Sup-

pressio, Pyelitis and others, that are frequently but not necessarily the result of gonorrhœal infection. The total number of cases admitted to the sick list for these diseases was 1232, including those continued from the previous year. Gonorrhœa alone contributing 560 of this number. Total days lost from all the diseases above mentioned, 25,590, and by gonorrhœa alone 10,794. This would give an average duration to each case of gonorrhœa of 19 days, but no one will, I am sure, hold that this represents the average time required for a cure, for many Medical Officers do not put men suffering from Gonorrhœa on the sick list at all and one officer informs me that he has not been in the habit of excusing these men from any duty, aloft or on deck as he believes rest is more or less debilitating. I think it is the general practice to discharge patients to duty as soon as the acute symptoms have subsided.

Forty men were invalided from the service during the year as a result of some one of the diseases above referred to, the greater portion being for Arthritis Gonorrhœica.

In order to gather information upon this subject I communicated with quite a number of Medical Officers, near at hand and to them I am greatly indebted for the prompt and comprehensive replies that were received.

It is not my purpose, in this paper, to pretend to present any new or original method of treatment but if I succeed in bringing about an active discussion of the methods of treatment I shall feel gratified. One officer wrote me that he "had tried practically every known treatment in this affection", and it is to get the benefit of such trials that I introduce the topic; to hear the experience of the members of the various services and to attempt to find out what really is the most valuable and effective method of treating this disease and preventing complications.

That the disease is, primarily, an acute local affection all admit but too often does it become chronic through lack of treatment, improper treatment, inactive or overstimulating treatment or lack of adherence to dietetic or hygienic regulations.

Occasionally, as Guiard has pointed out, it is true that the disease presents all the appearance of chronicity at the outset.



In a valuable paper presented at the Pan American Medical Congress at Havana, in 1901, Dr. Valentine has laid great stress on the baneful results of lack of treatment and mentioned the fact that many colleagues still dismiss the disease as a trifling ailment and that this view is transplanted to the public; this, unfortunately, is, to some extent true in the Naval Service and, as a result, the men frequently and I might say, generally, fail to report for treatment until the disease is well advanced and much damage is done.

The same result is brought about by the system of quarantining in the Navy for venereal disease; far be it from me to advocate the abandonment of this practice, for, severe as it seems, I believe it due to others that it should be so; but I am convinced that if Medical Officers would take a little trouble to explain to the men something of the nature of the disease and the importance of early treatment, much could be gained and a killing blow delivered to the opposition dispensary, generally located in a coal bunker.

Men fail to report for treatment for fear of restriction. It should be firmly impressed upon their minds that they will, probably, eventually have to report for treatment and then the restriction will be for a much longer period than if they reported at once and ended the disease in from two to four weeks.

Then, the facilities for proper and private treatment (and I wish to lay great stress on the latter adjective) are frequently lacking on board ship but with a little effort one can, especially in our modern ships, have a urinal and closet designated for the exclusive use of venereal cases where the treatment can be effectively carried out.

One of the chief elements in the proper management of these cases is absolute rest in bed until the acute symptoms have subsided. This is admitted by all, certainly by all to whom I wrote, with one exception, and yet the majority admit that they do not, as a rule, carry out this important point in the treatment owing to unfavorable conditions aboard ship. This is a mistake and I am sure that there are few ships where it could not be done even if there were no sick bay. Most of our modern ships, however,

have very good quarters for the sick and as this rest is necessary only in the very acute stage of the disease, I believe it can and should be accomplished not only for the benefit of the patient but to prevent infection of towels, &c., which are so frequently exchanged by men aboard ship.

I believe this has a more favorable influence on the course of the disease than any single point in the treatment.

Diet is another important item in the management of this disease and it is only by keeping the patient in bed or in his hammock that a restriction of diet, or better, if possible an absolute milk diet, can be effectively enforced.

In regard to medicinal treatment I find the corps about equally divided upon the question of internal medication and some are found who use only internal remedies during the earlier stages and resort to irrigations and injections only when the discharge become gleet.

Of the remedies most in use Oil of Sandal seems to be the most popular one, followed by Salol, Copaiba, Cubebs, and the carbonates in about the order named.

Of the solutions used for injection or irrigation, recommended, then are many but there is an absolute unanimity of opinion upon one point; that is, that it is not so much what solution is used but the frequency and thoroughness of its use and the strength of solution employed. The plan of treatment I have adopted and which has given good results, with few complications and an average duration of treatment of about two to four weeks is as follows.

The gonococcus having been found, or feeling reasonably certain of its presence, the patient is put to bed or in a hammock on an unstimulating diet until the acute stage has passed.

Every precaution is taken to catch all the discharge and to keep the parts thoroughly clean.

For the first few days, injecting, carefully introduced, of equal parts of hydrogen peroxide (Standard solution) and water, every two hours during the day. (The use of the peroxide I believe to have been first published by Surgeon von Wedekind, U.S. Navy in an article some years ago). When the discharge seems

a little less purulent, irrigation, with a double current nozzle or catheter, is resorted to, using a hot solution of mercuric chloride 1-5000 every two hours.

No internal medication is used unless indicated by much ardor urinæ or chordee until the last stages are reached, when *Ol. Santali* is given in large doses. Occasionally should the discharge become gleet, astringents are used and in such cases Zinc Sulphate alone and not combined with other salts and solutions chemically incompatible as is often the case, is used in strength varying from 1 to 2 grains to the ounce.

This mode of treatment is simple and easily carried out on board ship and has always given satisfactory results.

One officer reports remarkable results from the internal use of methylene blue in grain doses and records 40 cases acute and chronic with no complication and an early cure, but with this drug I have had no experience.

#### A STOMATITIS EPIDEMIC AMONG THE TROOPS IN SOUTH AFRICA.

IN the *Deutsche medicinische Wochenschrift*, Dr. J. C. J. Bierens de Haan describes an epidemic which broke out among the troops in South Africa, and also attacked many of the inhabitants who came in contact with them. The outbreak of the disease took place simultaneously with a great shortage in the supply of salt, and the trouble rapidly subsided when this article was supplied in sufficient quantity. The stomatitis was of the ulcerative variety, but was not attended by any constitutional symptoms. As a rule it was readily cured by the employment of mild antiseptics and astringents. Bacteriological examination of the cases was not possible, and hence the primary etiology is unknown. An accessory cause was undoubtedly the deficient supply of salt above noted.

PRACTICAL OBSERVATIONS UPON THE TREATMENT  
OF THE VENEREAL DISEASES MOST COMMON  
AMONG THE SOLDIERS OF THE GARRISON  
OF VERA-CRUZ.

BY LIEUTENANT COLÓNEL ZACARIAS ROJOS DE MOLINA.

DELEGATE FROM THE MEXICAN ARMY.

**T**HE Bubo, in the order of frequency, occupies the first place, as shown by the statistics annexed hereto, then follows the Chancre and Chancroids; Blennorrhagia or Gonorrhœa comes in the third place, and finally, the secondary Syphilitic manifestations.

I will first describe the treatment which I have followed in cases of gonorrhea, inasmuch as I consider it of the most practical value.

In order to combat this painful as well as disagreeable affection I have limited myself to local treatment, suppressing all medicine through the digestive canal, so commonly applied by all medical men.

The following Formula of--

Sulphate of Zinc,	Gr. 1.00,
Aqua Fonti,	Gr. 300.00,
	dissolved,

is the one which I have been using for over thirty years in my military as well as civil practice, yet not without having compared the effects with those of the treatment by permanganate of potassa, or with protargol, which has so extensively been in use during these last years.

The method of applying it is the following: I order the patient after urinating to inject with a small syringe filled with said solution, as many times per day as he passes urine. In order to subdue the pain during micturition, which is never wanting, and is one of the most disagreeable symptoms to the patient, I have

been using during the past few years the following Formula—

Sulphate of Zinc,	Gr. 0.020, milligr.,
Muriate of Cocaine,	Gr. 0.20, centigr.,
Distilled water,	Gr. 20.00,

with very excellent results, as it mitigates admirably the characteristic burning pain. The method of application is the following: I advise the patient after the urethral washing, to inject this solution with a straight dropper in the urethra. The average period of duration of the disease with this treatment has been from fifteen to twenty days, in exceptional cases one month at the longest.

In the treatment of the chancre or chancroids, I have never employed anything except the most suitable means to cicatrize them. After having exhausted all modern means, among which occupies the first place the nauseous iodoform, iodol, aristol, and all the long series of new medicines without denying their benefits,—inasmuch as all of them give satisfactory results,—but taking into account that a Military Surgeon has to reduce his therapeutic arsenal, to the smallest volume compatible with the object of his mission, the writer has fallen back upon the exclusive use of the classic Black Wash, without regard to its formula, whether French, English or American, in the treatment of chancres.

This preparation has the advantage, in addition to being very clean, cheap, and of easy application.

The mode of applying it is as follows: I advise the patient to take a thin sheet of absorbent cotton, extend it upon a flat plate and then soak it well with the preparation, taking care to shake previously the contents of the bottle, and with the sheet of cotton thus prepared to cover the ulcer; this I have him repeat four times per day.

When the ulcer takes an indolent character, or a phagedenic type, I have with infallible success employed the following powder:—

Salicylic acid,	Gr. 2.00,
Talco or Oxid of Zinc,	Gr. 10.00.

After three or four applications of this powder, the ulcer is cleaned, and the use of the Black Wash is continued until complete cicatrization has taken effect.

In cases of suppurated bubo, I have employed the following practice: I make an incision sufficiently large to completely discharge the contents; applying then a moist treatment by using a thick bandage of absorbent cotton, saturated with a 4% boric solution, renewing the same three times per day. I never needed to employ any other therapeutic agent to obtain the desired effect,—this treatment having the same advantages as those which I mentioned when describing the treatment of chancres: cheapness, cleanliness, and easiness of application, which are very important advantages in the treatment of persons who almost in their totality are ignorant people.

In indurated chancre I make use of no other topical means than that described in the treatment of chancroids,—Black Wash.

On the appearance of the infarction of the inguinal glands, which is a characteristic symptoms of syphilitic infection, I give the patient one mercurial pill, formula Ricord, every day; and I have observed that with this practice the secondary manifestations do not present the usual intensity.

In the secondary manifestations I have followed a mixed treatment: giving one pill of Ricord in the morning, and 0.50 centigrams of iodide of potash at bedtime. With this treatment I have seen disappear in less than one month the most serious manifestations in persons, who had been subjected to mercurial treatments of different kinds for several months.

Without denying the efficiency of hypodermic applications, which at present are so much in practice, I have never been compelled to employ them; in my opinion, they are painful and troublesome, since, with the method which I have described, I have obtained the disappearance of all specific manifestations in fifteen, or twenty days at most. Hypodermic treatment should be applied only in cases in which mercurial preparations will not be tolerated through the digestive canal.

This method I have followed over twenty years in my practice in the women's and children's Hospital of "Nuestra Señora de Loreto," as well as in my civil practice, with the most satisfactory results.

In tertiary manifestations the administration of saturated solution of iodide of potash, in progressive doses, has always given the very best results.

In the employment of iodide of potash it is always very convenient to commence with the smallest dose, increasing it gradually, until the desired effect is obtained. The method which I have always employed is the following:

Iodide of potash,	Gr. 25.00,
Distilled water,	Gr. 25.00,
	dissolved.

Of this saturated solution I commence to give 20 drops at bedtime in any kind of vehicle, compound syrup of sarsaparilla being one of the best, increasing the dose from 10 to 20 drops daily until obtaining modification of the tertiary manifestations.

Lately I have had two cases in which the patients were in danger of losing their noses, and I found myself compelled to increase the above mentioned dose to 200 drops every night, in order to arrest the progress of the nasal ulceration, and their noses were saved, thanks to this heroic treatment.

As soon as relief is obtained, I again commence with the initial dose, the same as when commencing the treatment, until all specific lesions have disappeared.

To patients of my civil practice I have recommended that, upon the slightest signs of the appearance of the disease, to put at once in practice the method indicated and in the same heroic degree.

Those cases of tertiary syphilis, whose manifestation did not disappear under the influence of this method, have been very exceptional. During twenty-five years of experience I remember only four cases, in which the treatment was entirely without effect, because they were cases of diathetic scrofulous persons, rebellious to any kind of treatment, as is well known to every practitioner who has had opportunity of observation.

At the beginning of my practice in Vera Cruz, the treatment in general use was that of Zitmann, which I tried over three years and then abandoned it as useless and repugnant. It requires an uncommon perseverance which will be rarely found among patients, in order to carry it to the end.

The efficiency of the "Arab," or dry treatment, which several authors, like Lallemann, L. Boyer, Malinowski, and others mention, is due to the two mercurial pills which the patient has to take every day; because such dry alimentation as biscuits, almonds, figs and grapes, and decoction of sarsaparilla, cannot exercise any influence in syphilitic manifestation, inasmuch as in this disease the efficiency of mercurial and iodide of potash preparations has been clearly demonstrated.

In describing these well demonstrated facts, I proposed to show that the military surgeon can very well reduce the number of medicines in his field medicine chest; at least those of common use in the tropics.

The paludal manifestations, so very common in these regions, and which cause the greatest proportion of sick in our Hospitals, can with full confidence of success be combatted by two preparations of the quinine salts: the chloride sulphate for hypodermic applications, and the sulphate of quinine with antipyrin through the digestive canal.

In conclusion I give the statistics as taken from the records of the Military Hospital under my direction, which have been treated according to the description above given. These statistics cover the period from 1892 to 1899 inclusive, viz:

Bubos in general,.....	569,
Chancres and Chancroids,.....	418,
Blennorrhagia or Gonorrhoea,.....	287,
Secondary syphilitic manifestations,.....	144.

The average number of soldiers of the garrison, during the period embraced by these statistics, has never been less than 1,200, which shows that approximately 13% annually were attacked by these diseases.



## HOW CAN MEDICAL OFFICERS PROMOTE EXPERT MARKSMANSHIP IN THE ARMY?

By BRIGADIER GENERAL J. FRANCIS CALEF.

SURGEON GENERAL (RETIRED) OF CONNECTICUT.

**S**UPERIOR marksmanship, coupled with superior mobility, is sure to win battles; guided by superior strategy, the highest military success is attainable. Into the realms of strategy the military surgeon may not presume to enter, yet how often must the most brilliant strategy fail when the surgeon brings up his men physically exhausted.

As we study the campaigns of Napoleon, we admire his dash and resourcefulness, his skill in handling political situations in order to promote his military success, but in looking back of the bronze cannon and the hardy men, we observe with equal admiration the wisest medical mind of his generation quietly devoting his great talents to the minutest details of military hygiene and surgery.\* The great commander grandiloquently said "An army marches upon its belly." The great surgeon knew this, but he knew also that without sound feet a full belly counted but little, and he cared for the feet. He knew that without keen eyes and sound nerves men could not fight and every attention known to science in his day was given to conserve the eyesight and nervous energy of the soldiers.

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\*Drawn in the footsteps of the conqueror throughout his vertiginous course, Larrey filled an important place in the Napoleonic epic. He was present on every battlefield, and established his ambulances in all the capitals of Europe. In this long and glorious series of campaigns, in this marvelous and dramatic triumphal march when the armies of France advanced from the Nile to the Danube, from Austerlitz to Madrid, from Wagram to Moscow, and from Leipzig to Waterloo, the figure of this army surgeon emerges, stands forth in surprising relief by the side of those warriors whom a hundred victories have consecrated. A character is revealed wherein science, authority, valor and humanity are combined in a degree never seen before and probably never to be seen again. In spite of a defective organization, Larrey contrived, single handed, to raise the medical service to a level with the rest of Napoleon's army. By the side of the machine made perfect for conquest and for death he placed another equally perfect but designed to succor and to preserve. From the inferior and discredited rank wherein, notwithstanding their talents, their good service and their personal sacrifices, the members of the healing art were subordinated in old-time armies, he raised himself to the level of the most illustrious captains and of the most celebrated physicians. From the one class he borrowed talent and intrepidity and from the other science and devotion, thus in his own person uniting the virtues of both.—*Friate's Life of Larrey.*

The valor of the surgeon is sometimes mentioned in reports, but his trying daily labor "for the good of the service" is never fully appreciated even by the commanders of the fighting arm.

Strategy and tactics aside, the efficiency of an army, is the sum of the efficiency of each of its units—the man behind the gun. Therefore a close study of how to make each soldier the most efficient fighting machine possible is the fundamental aim. This must begin in the recruiting station, and none but surgeons of keen natural perception, supplemented by wide experience with troops in the field, should pass final judgment upon the recruit. Any physician can determine the soundness of a man's body, but special skill and experience is required to determine his aptitude for a soldier, and a marksman.

Until the Civil war American armies have had the exceptional advantage of a large percentage of recruits who, from enlistment were superb marksmen, many of them familiar with the rifle from childhood, many from experience in warfare with aborigines, men of sturdy bodies, sound nerves and strong convictions as to the righteousness of their course. They fought to win and won. The Civil and Spanish American wars found some of these hardy frontiersmen left, who became the sharpshooters of their respective armies and in many situations in the Civil war were numerous enough to hold positions against much larger bodies of less expert men. North and South profited by this class of men, but in this respect the Confederate Army excelled. Most of the marksmen in the Civil war became so, only after long and costly training in the field, and many soldiers on both sides never became and never could become marksmen in any sense of the word.

With our small standing army, trained to shoot, and with every encouragement to form rifle clubs throughout this country, our next great war will find us rather better supplied with expert marksmen than did our recent wars, but still the enlistment of only such as can become good marksmen will be of paramount importance.

How decide this question? Best, I believe, by a careful study of the men who have shown themselves experts, a study of their physical, intellectual and even moral characteristics.

TABLE OF OCULAR AND OTHER CONDITIONS PRESENT IN  
FIFTY EXPERT MARKSMEN OF THE CON-  
NECTICUT NATIONAL GUARD.

No.	At 20 feet reads Snellen's No.		Astigmatism		Glasses	Shooting Eye	Color of Eye	Muscular Action	Intellect	Users of Alcohol	Standing in Community
	Right	Left	Right	Left							
1	16	24	slight	slight	No	R	brown				1
2	16	24	slight	slight	Yes	R	blue (m)			T.A.	1
3	16	16	absent	absent	No	R	brown			T	1
4	16	16	slight	absent	No	R	gray			T	1
5	16	24	absent	slight	Yes	R	hazel			T	1
6	16	16	absent	absent	No	R	blue (m)			T	1
7	16	16	absent	absent	No	R	blue (m)			T	1
8	10	10	absent	absent	No	R	blue (d)			T	1
9	16	16	absent	absent	No	R	blue (m)			T	1
10	10	24	absent	absent	No	R	blue (d)			T	1
11	16	10	absent	absent	No	R	blue (m)			T	1
12	10	10	absent	absent	Yes	R	blue (m)			T.A.	1
13	10	10	absent	v-sl't	No	R	blue (m)			T	1
14	10	10	v-sl't	v-sl't	No	R	br. (m)			T	1
15	16	10	slight	slight	No	R	blue (d)			T	1
16	10	10	v-sl't	v-sl't	No	R	hazel			T	1
17	10	10	absent	absent	No	R	blue (d)			T	1
18	10	10	v-sl't	slight	No	R	blue (m)			T	1
19	16	16	slight	absent	No	R	blue (m)			T	1
20	16	10	v-sl't	slight	No	R	blue (m)			T	1
21	16	16	slight	v-sl't	No	R	hazel			T.A.	1
22	16	16	absent	absent	No	R	blue (m)			T	1
23	16	10	absent	absent	No	R	blue (m)			T	2
24	10	16	absent	absent	No	R	blue (m)			T	1
25	16	24	absent	slight	No	R	brown			T	1
26	10	10	absent	slight	Yes	R	blue (m)			T	1
27	10	16	absent	absent	No	R	blue (m)			T	1
28	10	10	absent	absent	No	R	hazel			T	2
29	16	16	slight	slight	No	R	blue (d)			T	1
30	10	16	absent	absent	Yes	R	blue (m)			T	1
31	16	16	v-sl't	v-sl't	No	R	blue (m)			T	2
32	10	24	absent	slight	No	R	blue (d)			T	1
33	16	24	absent	v-sl't	No	R	gray			T	1
34	16	16	absent	absent	No	R	blue (m)			T	1
35	16	24	absent	absent	Yes	R	blue (d)			T.A.	1
36	16	16	absent	absent	No	R	blue (m)			T	1
37	10	16	absent	absent	No	R	blue (d)			T	2
38	16	16	absent	absent	Yes	R	brown			T	1
39	16	16	slight	slight	No	R	blue (m)			T	1
40	24	24	absent	absent	No	R	brown			T	2
41	16	16	absent	absent	No	R	blue (m)			T	1
42	16	16	v-sl't	slight	No	R	gray			T	1
43	16	24	absent	slight	No	R	blue (m)			T	1
44	10	10	absent	absent	No	R	blue (d)			T	1
45	16	16	slight	absent	Yes	R	blue (m)			T	1
46	16	24	absent	absent	No	R	blue (m)			T	1
47	10	16	absent	absent	No	R	hazel			T	2
48	16	16	v-sl't	v-sl't	No	R	blue (m)			T	1
49	10	16	absent	absent	No	R	blue (m)			T	1
50	10	16	absent	slight	No	R	brown			T	1

With very limited opportunities for these, I have yet examined the eyes and nervous systems, and have become somewhat acquainted with the intellectual powers and moral character of fifty expert marksmen of the Connecticut National Guard with

results shown in the accompanying tables. With the wide experience, accessible to the surgeon with troops in barracks, far more conclusive deductions might be drawn.

In explanation of the tables, the soldier was posted 20 ft. from a Snellens test card placed in a good light and the numeral against each eye indicates the letters easily read.

Astigmatism was roughly tested, with glasses removed, (if worn) with the usual test card. The color of eyes was determined by a surgeon familiar with the color cards of the U.S.A. or by myself.

The muscular action, quick (Q), or moderate (M), was determined by inspecting the man at target practice and drill, and in a few cases by careful measurement of the personal equation. The intellect was determined in most cases by personal acquaintance with the men and knowledge as to their educational advantages. A total abstainer (T.A.) is a *rara avis* in camp; but four men could certainly be so classed, and the rest without exception were moderate users of alcoholic stimulants. In the last column 2 indicates lack of thrift.

Every one of these men had won first class marksman's badges for at least two years, and many were sharpshooters of experience. (Connecticut Marksmanship Regulations).

With right eye,

19 read Snellens 10 at 20 ft.

30 " " 16 " 20 ft.

1 " " 24 " 20 ft.

With right eye,

Astigmatism absent in 34,

Slight or moderate in 9,

Very slight in 7.

With left eye,

14 read Snellens 10 at 20 ft.

25 " " 16 " 20 ft.

11 " " 24 " 20 ft.

With left eye,

Astigmatism absent in 29,

Slight or moderate in 13,

Very slight in 8.

Eight only used glasses. All but one shot right handed, using the right eye to sight. That one was left handed and his left eye was superior to the right, although slightly astigmatic. He used glasses. 35 had blue eyes, of which but 9 are rated M. 7 only are brown, 5 hazel and 3 gray. 39 were decidedly quick and sprightly in their motions, 11 were deliberate (M), and only one or two sluggish. 35 were superior (S) intellectually, the others up to the average (A) of National Guardsmen. In morals the men ranked above the average citizen of this community.

# Medico-Military Index.

## MEDICO-MILITARY ADMINISTRATION.

Ausgestaltung (Zur) der Marodenzimmer des K. u K. Heeres, nach den Erfahrungen eines Truppenarztes. 8°. Wien, 1902.

Conference Internationale des Sociétés de la Croix-Rouge, St. Pétersbourg, 1902, VII<sup>me</sup> Comité central des sociétés allemandes de la Croix-Rouge. Rapport sur l'activité de la Société allemande pendant les guerres greco-turque et sud africaine et pendant l'expédition en Chine. 4°. St. Pétersbourg, 1902.

— VII<sup>me</sup> Rapport présenté au nom de la Société française de secours aux blessés militaires des armées de terre et de mer. Question: "Application pratique par les Sociétés de la Croix-Rouge des principes posés par la convention de La Haye en matière de guerres maritimes." 4°. St. Pétersbourg, 1902.

— Question: "Les Sociétés de secours aux blessés peuvent-elles et doivent-elles se charger des soins à donner aux prisonniers de guerre dans les termes du règlement de La Haye." 4°. St. Pétersbourg, 1902.

— Question: "De la meilleure méthode d'instruction pour préparer les dames à remplir, en temps de guerre le rôle d'infirmières volontaires." 4°. St. Pétersbourg, 1902.

— VII<sup>me</sup> Rapport du Comité Internationale de Genève. Du secours international en temps de guerre. 4°. St. Pétersbourg, 1902.

— VII<sup>me</sup> Rapport du Comité Supérieur de la Croix-Rouge à Prétorie durant la guerre sud-africaine de 1899. 4°. St. Pétersbourg, 1902.

— VII<sup>me</sup> Rapport du Comité Central Russe 8. aperçu des résultats de l'assistance prêtée par la Société de la Croix-Rouge de Russie pendant les guerres ayant éclaté depuis la dernière conférence de Vienne, en 1897. 4°. St. Pétersbourg, 1902.

— II. Quelle est l'activité qui en temps de paix, répond le mieux à la tâche essentielle de la Croix-Rouge et contribue à préparer le plus efficacement possible les Sociétés de la Croix-Rouge à remplir leur mission en temps de guerre? 4°. St. Pétersbourg, 1902.

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**Coleman (J. R.)** Medical experiences in South Africa. *Tr. Roy. Acad. M. Ireland*, Dublin, 1900-1901, xix, 76-86.

**Ryerson (G. S.)** My experiences in war; a contrast, 1885-1900. *Buffalo M. J.*, 1902-3, n. s., xlii, 1-10.

**Sadovski (A. O.)** [Reminiscences from the Transvaal and travellers impressions.] *Voenno Med. J.*, St. Petersburg, 1902, lxxx, med. spec. pt., 1499-1534.

**Seaman (G. E.)** Some observations of a medical officer in the Philippines. *Milwaukee M. J.*, 1902, x, 181-189.

## MILITARY HYGIENE.

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**Duncan (A.)** The prophylaxis of sunstroke. *Brit. M. J.*, Lond., 1902, ii, 857.

**Freer (E. L.)** Putties and varix in the Army. *Brit. M. J.* Lond., 1902, ii, 1807.

**Hiller (A.)** Der Hitzschlag auf Märschen, mit Benutzung der Akten des Preussischen Kriegsministeriums. Berlin, 1902.

## MILITARY SURGERY.

**Axhausen (G.)** [Antisepsis or asepsis on the battle-field.] 8°. Berlin, 1902.

**De Crecchio (G.)** Sulla perdita di peso dei proiettili da rivoltella nelle ferite penetranti del cranio. *Arte med.*, Napoli, 1902, iv, 653.

**Habart (J.)** Kriegschirurgische Betrachtungen über den südafrikanischen Krieg. *Militärarzt, Wien*, 1902, xxxvi, 97; 131.

**Hickson.** Gunshot wound of the perineum. *Brit. M. J.*, Lond., 1902, ii, 1649.

**Karrenstein (E.)** [How gunshot fractures of the diaphyses of long bones are produced.] 8°. Berlin, 1902.

**LaGarde (L. A.)** Gunshot wounds of the head and cranium. *Med. Communicat. Mass. M. Soc.*, Bost., 1902, xix No. 1, 287-291.

**Laval (E.)** Les blessures de l'articulation coxo-fémorale par balles de petit calibre. *Caducée*, Par., 1902, ii, 197.

**Levy (A.) & Ponsot (R.)** Accident mortel au tir à la cible par une balle Lebel tirée à courte distance. *Arch. de méd. et pharm. mil.*, Par., 1902, xl, 145-152.

**Mathiolius.** [Observations on the condition of military surgery]. *Deutsche Ztschr. f. Chir.*, Leipz., 1902, lxvi, 199-221.

**Nancrede (C. B.)** The results of wounds of the large joints made by modern military projectiles. *Ann. Surg.*, Phila., 1902, xxxvi, 368-378.

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## Editorial Department.

### ALTERATIONS OF THE CONSTITUTION AND BY-LAWS OF THE ASSOCIATION NECESSITATED BY ITS INCORPORATION.

**T**HE following proposed alterations of the Constitution and By-Laws of the Association of Military Surgeons thought to be demanded by the act of incorporation and the new status of the Association secured by it, are presented for the consideration of the members. Only the amended articles and sections are presented, those not requiring change or requiring re-numbering only not being reprinted.

#### PREAMBLE.

*The Medical Officers of the Army, of the Navy, of the Public Health and Marine Hospital Service of the United States, and of the Militia of the different States, under the provisions of an act of Congress approved January 30, 1903, have associated themselves together under the name of "The Association of Military Surgeons of the United States." Now, therefore, pursuant to the laws of the United States, the members of said Association do hereby ordain and enact the following:*

#### CONSTITUTION.

##### ARTICLE I.

###### NAME.

The Association shall be known as "THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES."

##### ARTICLE II.

###### OBJECT.

The object of the Association shall be to increase the efficiency of the medical services of the Army, the Navy, the Public Health & Marine Hos-

pital Service, and of the Militia of the different States by mutual association and the consideration of matters pertaining to the medico-military service of the United States both in peace and in war.

### ARTICLE III.

#### MEMBERS.

##### CLASSIFICATION OF MEMBERSHIP.

SECTION 1. There shall be Active, Life, Associate, Ex-Officio, Corresponding and Honorary Members.

##### MEMBERS ELIGIBLE TO OFFICE AND ENTITLED TO VOTE.

SECTION 2. ....

##### ACTIVE MEMBERS.

SECTION 3. ....

##### LIFE MEMBERS.

SECTION 4. Life membership and exemption from the payment of annual dues is conferred upon—

1. Members who obtain first honorable mention in the prize competitions of the Association.

2. ....

##### ASSOCIATE MEMBERS.

SECTION 5. ....

##### EX-OFFICIO MEMBERS.

SECTION 6. The Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, the Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health & Marine Hospital Service, in conformity with the Act under which this Constitution is adopted, shall be ex-officio members of the Association.

##### CORRESPONDING MEMBERS.

SECTION 7. ....

##### HONORARY MEMBERS.

SECTION 8. The President of the United States, the senior General officer of the Army, and the senior flag officer of the Navy for the time being, shall be honorary members. Other persons who have rendered distinguished services to the Association, or who have otherwise attained distinction deserving of recognition by the Association, are eligible to honorary membership.



ARTICLE IV.

GOVERNMENT OF THE ASSOCIATION.

ADVISORY BOARD.

SECTION 1. There shall be an Advisory Board consisting of the Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, the Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health & Marine Hospital Service and the President of the Association.

OFFICERS.

SECTION 2. The officers shall be a President, three Vice-Presidents, a Secretary and a Treasurer, who shall hold their respective offices until their successors are elected and qualified.

EXECUTIVE COUNCIL.

SECTION 3. There shall be an Executive Council, to consist of the officers, the ex-presidents and six (6) members, who shall be appointed by the President each year.

STANDING COMMITTEES.

SECTION 4. There shall be the following Standing Committees, to be appointed annually by the President, except as hereinafter specified:

A Literary Committee.....

A Publication Committee.....

A Necrology Committee to consist of three (3) members.

A Transportation Committee to consist of one (1) or more members.

A Committee of Arrangements for the next ensuing meeting, to consist of one member, who shall be the chairman, with power to associate with himself such other persons, members of the Association or not, as he may see fit.

A Nominating Committee.....

BOARDS OF AWARD.

SECTION 5. Boards of Award shall be appointed by the President for the consideration of such prize competitions, as may from time to time be instituted by the Association. Membership in the Association shall not be required of members of the Boards of Award, which shall be selected in each instance from men conspicuous for knowledge of the subject of the competition.

ARTICLE V.

SEAL, INSIGNIA AND ARMS.

SEAL.

SECTION 1. The seal of the Association shall consist of a circle, one

and three-eighths ( $1\frac{3}{8}$ ) of an inch in diameter, charged with the cross of the insignia with the words "Organized 1891, Incorporated by Congress, 1903," within a circumferential band bearing the words "Association Military Surgeons United States."

#### INSIGNIA.

SECTION 2. The Insignia of the Association shall comprise (1) a Cross; (2) a Button.

(1). The Cross shall be of gold, the obverse, enameled with red and bordered with gold, upon which shall be superimposed, a white shield, enclosing a shield of the United States in its proper colors,—red, white and blue, with stars of gold,—surrounded by the motto "*Omnia pro Patriae Caritate*"; the reverse, plain gold and bearing its number. Upon the reverse may also be engraved the name and address of the owner. The cross suspended by a ribbon, consisting of two bands of crimson enclosing a band of white, may be worn by any member of the Association on ceremonial occasions, and shall be carried on the left breast,—or at the collar, if the wearer be an officer of the Association.

(2). The Button shall consist of a red enameled cross, outlined in gold, upon a field of white enamel surrounded by a blue band, three-fourths ( $\frac{3}{4}$ ) of an inch in diameter routlined on either side by circles of gold, and bearing the legend also in gold, "*Omnia pro Patriae Caritate*." It may be worn by all members at their discretion in the upper left-hand button-hole of the civilian coat.

#### COAT OF ARMS.

SECTION 3. The Coat of Arms shall consist of a shield, bearing in the center the cross of the insignia of the Association and, quartered about it, the caduceus, the acorn, the crossed anchor and caduceus and a crossed saber and rifle, surmounted by a red-cross guidon,—emblematic of the Medical Departments of the Army, the Navy, the Public Health & Marine Hospital Service and the State forces,—with a crest consisting of an eagle with outspread wings, bearing a Geneva Cross upon his breast,—emblematic of the patriotic and altruistic character of the Association.

#### ARTICLE VI.

##### QUORUM.

.....

#### ARTICLE VII.

##### AMENDMENTS.

.....

BY-LAWS.

ARTICLE I.

ELECTION TO MEMBERSHIP.

.....

ARTICLE II.

EXPULSION FROM MEMBERSHIP.

.....

ARTICLE III.

MEETINGS.

.....

ARTICLE IV.

DUES AND DELINQUENTS.

ADMISSION FEE.

SECTION 1. The admission fee to be paid by Active and Associate members shall be three dollars, (\$3.00), which shall accompany the application for membership.

ANNUAL DUES.

SECTION 2. The annual dues shall be three dollars, (\$3.00), due on the first of January of each year. No annual dues shall be required of new members for the remaining portion of the calendar year in which their admission fees have been paid.

DELINQUENTS

SECTION 3. ....

MEMBERS EXEMPT FROM DUES.

SECTION 4. Honorary, Corresponding, Ex-Officio, and Life members shall be exempt from the payment of dues.

ARTICLE V.

DUTIES OF THE ADVISORY BOARD.

The Advisory Board shall meet at such times as the interest of the public service may demand. Meetings may be called by one or more members of the Board and three members shall constitute a quorum. Any action taken by the Board shall be reported to the Association through the President of the Association.

## ARTICLE VI.

## DUTIES OF OFFICERS.

## THE PRESIDENT.

SECTION 1. ....

## THE VICE-PRESIDENTS.

SECTION 2. ....

## THE SECRETARY.

SECTION 3. ....

## THE TREASURER.

SECTION 4. ....

## ARTICLE VII.

## THE EXECUTIVE COUNCIL.

## DUTIES.

SECTION 1. The Executive Council shall be charged with the conduct of the affairs of the Association during the intervals between the annual meetings, shall elect active and associate members, and perform such other duties as may be assigned to it by the Constitution and By Laws or by vote of the Association at any stated or special meeting.

## CONDUCT OF BUSINESS.

SECTION 2. The business of the Executive Council may be conducted by correspondence or at such meetings as may be called by the chairman upon his own initiative or at the request of any three members.

## OFFICERS.

SECTION 3. The president, the secretary and the treasurer of the Association respectively shall be *ex-officio* chairman, secretary, and treasurer of the Executive Council.

## QUORUM.

SECTION 4. Five members of the Executive Council shall constitute a quorum for the transaction of business.

## ARTICLE VIII.

## DUTIES OF COMMITTEES.

## THE LITERARY COMMITTEE.

SECTION 1. ....

## THE PUBLICATION COMMITTEE.

SECTION 2. ....

## THE NECROLOGY COMMITTEE.

SECTION 3. The Necrology Committee shall report to the Association at each annual meeting, the deaths that have occurred during the preceding

year among the members of the Association, with a suitable memoir in each case.

THE TRANSPORTATION COMMITTEE.

SECTION 4. The Transportation Committee shall have charge of the arrangements for the transportation of members to and from the meetings of the Association.

THE COMMITTEE OF ARRANGEMENTS.

SECTION 5. The Committee of Arrangements shall have charge of all local arrangements for the annual meetings of the Association.

THE NOMINATING COMMITTEE.

SECTION 6. ....

ARTICLE IX.

DUTIES OF BOARDS OF AWARD.

Boards of Award shall be charged with the selection of the person or persons to whom prizes shall be awarded, in accordance with the regulations of such prize competitions as may, from time to time, be instituted, and shall report the results thereof at such time as may be designated by the Association.

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THE FIRST ARMY HOSPITAL CORPS COMPANY OF  
INSTRUCTION ORGANIZED BY COMPETENT  
AUTHORITY.

I WISH to invite attention to a misstatement which appears in the review of the new Manual for the Medical Department of the United States Army in the February number of this JOURNAL. The statement is to the effect that the first company of instruction organized by competent authority was in the Division of the Philippines, May 23, 1900.

The Company of Instruction, Washington Barracks, D.C., was organized by authority of the Secretary of War under date of August 16, 1893. This authority was in compliance with a request of the Surgeon General dated August 5, 1893, that a company of instruction be established at this station. The Company was designated First Company, November 8, 1902, and at the same time the Second Company was established which I believe had had no previous authority for its existence. FREDERICK P. REYNOLDS.

## Reviews of Books.

### THE IMPERIAL YEOMANRY HOSPITALS IN SOUTH AFRICA.\*

THE work of the Imperial Yeomanry Hospitals in South Africa in 1900-1902 is superbly set forth in the three sumptuous volumes produced under the direction of the Countess Howe. The three volumes are handsomely illustrated and devoted respectively to Organization and Administration, Field Hospital and Bearer Company, and Medicine and Surgery. Military medical work has rarely had so satisfactory a presentation, and both the editor, the publisher and the public,—as well as the officers whose service is so well pictured,—are to be congratulated upon the magnificent volumes produced.

### MEDICAL MICROSCOPY.†

CLEARNESS and compactness are the most striking characteristics of this little volume. Designed for the beginner in microscopy and particularly for him who must work without the advantage of the personal guidance of a teacher, the book is free from all accessory matter which might confuse the student in the absence of a guide to microscopical study. For this reason, but one method is given for the attainment of a desired result, that which in the author's experience has proven the best for routine work and at the same

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\**The Imperial Yeomanry Hospitals in South Africa, 1900-1902.* Edited by the COUNTESS HOWE. 3 vols. Imp. 8 vo. London, Oliver Williams, 116 Victoria St., 1902.

†*Medical Microscopy.* Designed for Students in Laboratory Work and for Practitioners. By T. E. OERTEL, M.D. 8vo; pp. xxi, 362; 131 illustrations. Philadelphia, P. Blakiston's Sons & Co., 1902.

time the simplest and least liable to error. The illustrations are good and ample in number, and the mechanical execution of the book is excellent.

#### HEATH'S PRACTICAL ANATOMY.\*

**A**NINTH edition of this work has been issued by the publishers for the student and practitioner. The volume has been curtailed in a manner by leaving out the references to surgery and increasing its usefulness by distributing the colored plates throughout the volume, under the appropriate heading, instead of the beginning of book, as in previous edition.

The revision has improved the appearance of the book and makes it, what it is intended for,—a ready reference for the student and practitioner.—A. R. ALLEN.

#### PHYSIOLOGY† AND POISONS‡.

**T**HE little manuals of Brubaker on Physiology and of Tanner and Leffmann on Poisons fill a clearly defined niche in medical literature as is witnessed by the fact that the former has passed through ten and the latter has exhausted eight prior editions. In each case careful revision has brought the work up to date and put it in line for continuous usefulness.

#### THE VENEREAL PERIL.§

**T**HE accomplished prize essayist of the Association of Military Surgeons for 1902 has produced a most practical and useful little guide book for the young soldier upon the most prolific source of disability in the military and naval ser-

\**Heath's Practical Anatomy.* Edited by J. ERNEST LANE, F.R.C.S. 8 vo; pp. xviii, 696; 321 illustrations. Philadelphia, P. Blakiston's Son & Co., 1902.

†*A Compend of Human Physiology.* By ALBERT P. BRUBAKER, A.M., M. D., *Eleventh Edition, Revised and Enlarged.* 12 mo; pp 270; 34 illustrations; Philadelphia, P. Blakiston's Son & Co., 1902.

‡*Memoranda on Poisons.* By THOMAS HAWKS TANNER, M.D. *Ninth Revised Edition,* By HENRY LEFFMANN, M.D.; 24 mo; pp. 177; Philadelphia, P. Blakiston's Son & Co., 1902.

§*The Venereal Peril. For the Information and Guidance of Young Soldiers.* By Lieutenant Colonel VALERY HAVARD, U.S.A. 8 vo; pp. 11.

vices. Chancroid, gonorrhea, and syphilis are correctly but non-technically described, with emphasis upon the sequelæ and remote consequences of infection. The booklet closes with a section consisting of good advice stated in so manly and honest a manner as to be calculated to deeply impress the young men for whose instruction it is designed.

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#### SAUNDERS' AMERICAN YEAR-BOOK.\*

THE volume on surgery for the year 1903, shows the usual careful editing and abstracting displayed in the previous volumes. The subjects, covering the different fields of surgery, have been carefully selected and represent the leading articles published during the past year. In addition the cuts and plates of the original articles have in many instances been used to elucidate the text.

The indexing has been well done, and as the articles are carefully grouped, reference to any subject is an easy matter.

The book has become a necessity to the profession for its conciseness and reliability; as well as for its value as a work of reference.—A. R. ALLEN.

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\**The American Year-Book of Medicine and Surgery for 1903.* A yearly Digest of Scientific Progress and Authoritative Opinions in all branches of Medicine and Surgery, drawn from journals, monographs, and text-books of the leading American and foreign authors and investigators. Arranged, with critical editorial comments, by eminent American specialists, under the editorial charge of GEORGE M. GOULD, A.M., M.D. In two volumes—Volume II, *General Surgery*, Octavo, 670 pages, fully illustrated. Philadelphia, New York, London: W. B. Saunders & Co., 1903.



## OBSERVATIONS ON WOUNDS OF NERVES.

BY CAPTAIN JAMES P. WARBASSE.

OF NEW YORK.

ASSISTANT SURGEON IN THE NATIONAL GUARD OF NEW YORK.

SINCE Cruikshank's studies in 1776 upon wounds of nerves and their regeneration, a vast amount of literature, embodying observations on these subjects has accumulated; and in no department of scientific work have there been wider discrepancies of opinion and greater evidences of inaccuracy of observation than in this. These inaccuracies have arisen from our incomplete knowledge of the physiology and pathological anatomy of the nerves, and from the wide divergence between the respective fields of neurology and surgery. The culpability has lain largely on the side of the surgeon, who has not appreciated fully the highly specialized character of the tissue with which he has been dealing; while the neurologist may be accused of a failure to appreciate the possibilities of the most advanced surgery. The surgeon particularly has oftenest lost sight of the long period which may in some cases be required for the regeneration of a nerve and the restoration of its function; while both have in many cases failed to appreciate the phenomena of nerve anastomosis and anomalous nerve distribution. Thus we have seen the operation of nerve suturing declared unsuccessful even before the process of degeneration could have been completed. On the other hand the operation has been regarded as successful when the restoration of function has been through nerve intercommunication or has been only apparent because of inadequate tests for restoration or because of anomalous nerve distribution.

The wounds of nerves which we are called upon to treat vary from the slight contusion, which causes only a temporary congestion and local effusion of serum and white cells into the substance of the nerve, to lacerations or incised wounds involving the whole

thickness of the nerve and the surrounding tissues. The character of the injury can not be determined from the immediate symptoms. Identical symptoms may be produced by a severe contusion, a laceration or a complete division of a nerve trunk. The pain at the time of injury of a mixed nerve usually is not severe. It may be only a flash of pain or be referred as an instantaneous shock felt over the distribution of the nerve. I have had a man who was shot through the brachial plexus tell me that he thought some one had struck him on the elbow. As soon as the communication of a nerve is interrupted the consciousness of pain seems to end until the traumatic congestion or inflammation develops. Tingling or formication may be present, but these probably depend upon some condition such as hemorrhage or the irritation of parts lying against the wounded nerve. The degree of injury to the nerve is best judged by the muscular paralysis. However, even in contusions and slight lacerations complete paralysis may persist for several days, and then gradually subside. Restoration of function does not occur in this way in division of the nerve; when the division of a nerve is complete, the muscular paralysis is followed, within twenty-four hours by a diminution of faradic contractibility. The muscle becomes flabby and less firm to the touch. This softness of the muscle continues to increase, and all the while the muscle shows less and less response to the faradic current until after a period varying from four to eight days there is no response at all. This is the conclusive evidence of complete interruption of motor impulses. Responsiveness to galvanism continues for a much longer time. This changes after some weeks to the reaction of degeneration.

The symptoms of complete division of a nerve have been simulated by pressure of a sharp edge of fractured bone. As a matter of fact if the pressure continues, the condition is about the same; and the scar forming at the site of pressure may be likened to the scar of wounded tissue.

Without seeing the divided nerve a diagnosis of division can not be made until all of the functions of the nerve have been studied—touch, pain, temperature, pressure, and localization senses. Many of the symptoms may point to nerve division: there

may be absence of pain-sensation and muscular impulse, but the touch sense may remain. If any evidence of impulse transmission remains, it is probable that the nerve has sustained a contusion or incomplete laceration. But always in determining these signs, the various intercommunicating, recurrent, and anastomosing branches must be borne in mind, and also the possibility of anomalous distribution. Because of the fine intercommunicating nerve filaments under the skin, particularly in the more sensitive parts such as the hand and face, the sensory paralysis never seems so complete as that of the muscles.

Usually after the complete division of a peripheral nerve the patient has a sensation of cold in the paralyzed area. Kraussold and Rhoden found that after division of the ulnar nerve the temperature of the paralyzed area fell as much as  $10^{\circ}$  or  $17^{\circ}$  F. In rare cases a slight elevation of temperature has been observed.

The large category of subsequent disturbances depend upon the less known functions of peripheral nerves. Disturbances of the nerves regulating the skin secretions, the vaso motor actions, the metabolism and nutrition of the part are all to be counted with. Thus there may be manifested burning, prickling pain, formication, an increase in the secretion of sweat, or excessive dryness of the skin. Cutaneous affections such as herpes, eczema, erythema, may appear. There may be disturbances in the nutrition of the skin as the formation of ulcers and gangrene. The skin, may become œdematous, shiny, cyanotic or abnormally pale. In the periosteum and bones there may be trophic disturbances. The joints may become the seat of effusion or exudation with deformity and ankylosis. Even graver neuropathic conditions may be present, resulting in destruction of the joint or subluxation. All of these conditions are the later symptoms which may appear after the degeneration of the nerve. They are important to the surgeon for by their presence he may know that the impulse transmitting capacity of a nerve is defective either before or after operation.

It is not the intention of this paper to enter into the discussion of phenomena of degeneration. Let it suffice to say that the presence or absence of the reaction for degeneration should always

be determined in cases of supposed traumatic interruption of impulses, and that the surgeon is usually eminently unqualified to make these tests. The occurrence of neuritis in divided nerves is a matter of much surgical importance. The general belief and teaching is that a severed nerve will always degenerate, a contused nerve sometimes, but that there can be no rule for the occurrence of inflammation. This is probably not altogether true as far as it applies to wounds of nerves, for it may be set down as a rule that the danger of neuritis is inversely as the wound is free from infective microorganisms. There is still much confusion regarding this question of neuritis, for a large category of degenerative changes which are not properly inflammations in any sense have been designated as neuritis. Strümpell claims that traumatic neuritis must always arise from an open wound, and that it is only from such wounds that ascending neuritis results. Aseptic wounds, he claims, never give rise to neuritis, but only to degenerative disturbances, followed by secondary degeneration, outgrowth of new connective tissue and finally by regeneration. According to the observations of Marinesco (*La Presse Médicale*, Nov. 23, 1898) in an infected wound associated with neuritis he found streptococci infiltrating the diseased nerve near the wound, while higher up, near the cord, the sections of the nerve showed leucocytic infiltration but no bacteria. This he explained by the assumption that the ptomaines of the cocci had been transmitted up the course of the nerve through the lymphatics of the nerve and had caused the evidences of inflammatory irritation which the microscope had revealed.

Traumatism to a peripheral nerve may apparently seem unimportant at the time of injury, and yet the nerve may be left in such a condition that years afterwards a trivial cause may be sufficient to effect its complete paralysis. Weber (*Deutsche Zeitsch. für Nervenheilkunde*, Vol. XV, Nos. 3 and 4. p. 181.) has reported two cases of ulnar paralysis, in one of which an infection of the elbow joint preceded the paralysis twenty-seven years, and in the other thirty-three years. Careful investigation into many obscure cases of nerve paralysis would probably show that an old trauma or localized infection was the cause of the palsy.

In the cases of open wounds of nerves, the fact that some time always intervenes between the injury and the occurrence of the neuritis, and that the inflammation of the nerve usually is announced by a rigor, points pretty conclusively to the infective etiology of this complication. Large nerve trunks are more susceptible to this inflammation than small ones, and the centripetal spread of the disease is common when infection is present. As far as the susceptibility to this spreading inflammation goes, constitutional conditions seem to play an important role. In the other tissues of the body the character of the infection is the all important determining cause; but in nerve tissue the susceptibility to spreading inflammation seems very largely dependent upon the general resisting capacity. Thus in alcoholics, syphilitics and other individuals whose resisting power, has been lowered or whose tissues have been for a long time subjected to the vitality lowering effects of constitutional poisons, neuritis is prone to occur.

When a nerve has been divided, and the reaction of degeneration has supervened, and the wound has healed without complications, the fate of the peripheral segment must depend largely upon the degree of separation of the divided ends and the amount and character of the connective tissue scar interposed. In the ultimate process of regeneration, there is always a tendency for the upper segment to proliferate nerve tissue at its cut end. If these new nerve filaments reach the distal cut end, a communication is reestablished and nerve tissue may be deposited until the continuity of the nerve is fully restored. This is a natural reparative process which may always be hoped for, and which has required in some cases as long as twenty years for its completion. If there is but little intervening scar, and particularly if the fibers of the intervening tissue lie mostly in a direction parallel to the nerve, the restoration of function may be accomplished in a short time. If however these favorable conditions do not exist, the reparative effort results in the building up of a mass of nerve and fibrous tissue at the end of the proximal segment, which appears as a ball or club-shaped termination, while the paralyzed distal portion of the nerve lies atrophied and inactive.

In operations for facial neuralgia a nerve has been divided or as much as two inches of its substance resected, and later pain has returned, by virtue of a restoration of nerve tissue across the defective gap. This has been particularly observed in the inferior dental canal. In such a case the intervening space after the operation has been filled by loose tissue, the common direction of the fibers of which has been parallel with those of the nerve filaments, thereby favoring and directing the new nerve growth towards the distal end.

In the surgical treatment of wounds of nerves, the surgeon has these principles for his guide. The treatment of the wound should be so conducted as to give rise to the smallest possible amount of new connective tissue. In order to accomplish this, early suture and the prevention of infection are called for. Notwithstanding the reports of primary union of nerves and immediate restoration of function, which appear from time to time, it is still questionable whether this can occur in man. The experiments of Glück proved that primary union could take place in the fowl and rabbit. Ten days after dividing and suturing the vagus in a rabbit, he has divided the nerve of the opposite side and the animal did not die; but when following this by division of the nerve that had been sutured, death has taken place immediately, showing that the suture had restored the function of the nerve first divided. In man it is different; although some of Bowlby's cases almost suffice to prove the possibility of success.

All experience up to the present time goes to show the advantage of immediate suture. This should be done as soon as a diagnosis of division of a nerve trunk has been made. When there is any doubt the nerve should be exposed and examined. In fresh wounds in the arm, I have been struck by the extent of retraction which may take place in divided nerve ends. These may be found by extending an incision over the course of the nerve. When the ends have been secured they should be brought down until they will lie in easy contact. I believe it is a mistake to depend upon the suture to actually hold the ends together. The suture should be regarded more in the nature of a splint to steady the parts until union takes place. In order that the ends may lie

in easy contact it often becomes advisable to make traction upon the stumps to stretch them. This operation is not only not fraught with harm to the nerve, but is of positive assistance in securing the best result.

Preeminently the best suture material is very fine chromicised gut or fine kangaroo tendon. Silk I believe to be seriously objectionable. I have seen it used by surgeons for this purpose, and I am satisfied that it can not be too strongly condemned. Every strand of silk left buried in the tissues, no matter how small, is surrounded by a capsule of new connective tissue. This is just what the surgeon should strive to eliminate in operations on nerves. The ends of the nerve should be evenly trimmed, and, having been stretched until they lie in easy contact, the sutures passed with the finest possible needle. In a nerve such as the median or musculo-spiral, the most satisfactory suture consists in four separate sutures of the four quadrants of the nerve's circumference, passed transversely through the nerve sheath about 3 or 4 mm. from the end. Having applied these sutures, a layer of fascia should be sewed over the nerve wound to act as a splint and to further serve the purpose of eliminating dead space in which new connective can form. If fascia is not available then muscle or other tissue should be sewed over the nerve so as to lie firmly and closely in contact with the sutured nerve wound. When this operation is done without infection, the surgeon may await with confidence the restoration of the function of the nerve. It is from this time on, however, that the surgeon is wont to display how little of a neurologist he is. In all of his work he has accustomed himself to see improvement follow a successful operation. His mind is habituated to this condition. If improvement does not follow, the habit of his faculties evolves the impression of failure. These unreasoned impressions prevail the more strongly when, as is usually the case after primary suture, the symptoms of paralysis not only fail to improve but actually grow worse. The surgeon, after his operation, sees the muscles grow more flabby and the limb atrophy from week to week, and the faith in his operation fails him. On the other hand we have seen the surgeon, who discovers that the area supplied by the nerve which he has

just sutured is already sensitive to pressure and the prick of a pin, almost before degeneration has begun, and the suggestion of restoration of function comes to his mind. These are the reasons why the reports of the surgeon often are confusing and unreliable.

The secondary suture of divided nerves has become an operation of great importance and satisfaction, and has born witness to the persistent vitality of this highly organized tissue. It presents the advantage that restoration of function may be accomplished more quickly because the process of degeneration has been gone through with. This operation consists in dealing with a locus of interrupted nerve, which may be due to actual division and separation of the nerve, to a deposit of fibrous inflammatory tissue, or to compression from without. When the operation is done for division of nerve the two ends should be freely exposed, the intervening scar tissue removed, and the bulbous proximal extremity cut away until nerve tissue is exposed which is not densely infiltrated. In order to bring the ends together stretching almost up to the point of evulsion is indicated. When this can not be accomplished any of the various neuroplastic operations may be attempted. The nerve may be lengthened by turning down a flap from one or both sides, by making a sliding flap of nerve or by grafting the two separated ends upon a neighboring nerve. Glück has demonstrated the practicability of this latter operation. Where the paralysis is due to the presence of nerve scar strangulating the nerve cells or to exertional pressure from callus or angle of bone the exciting cause must be removed and the structure treated *de novo* as a divided nerve. The cardinal principle in all of these operations is the minimizing of the amount of scar tissue, and the bringing together of structures which are free from fibrous deposits. In wide separations the expedient of nerve grafting has been attempted by Atkinson and Moullin with doubtful success. The introduction of strands of cat gut to act as a trestle through which the new nerve cells may be guided in this growth apparently in a few cases has proven of service. Forcible stretching even to concealed separation of the nerve I am inclined to look upon as the best of the last resorts.



After the wounds have been closed it is important that the limb or part be immobilized by splints in order to insure quiet of the muscles about the wound. After a varying period there is a return first of sensitive and then of motion. The improvement in motion has continued as long as twenty years after the injury. Gradual improvement in sensation makes the outlook for motion encouraging. After two weeks, when the nerve ends have had time to unite, massage and electrization of the paralyzed parts is indicated, to maintain the nutrition of the soft tissues and preserve the suppleness of the joints.

Surgeons do not fully appreciate the value of nerve suturing. If a satisfactory operation has been done the result must be watched for months and years. Most cases are lost sight of after a few weeks or months, at which time the result looks bad. The surgeon must have patience. If the nerve ends have been placed in good opposition he may with confidence leave the result to time. An examination of the voluminous clinical and physiological literature corroborates this hope. The failures in nerve suturing have been due to infection of the wound, too great tension upon the nerve sutures, the use of unabsorbable suture material, and failure to remove or prevent the formation of nerve constricting connective scar tissue; notwithstanding these things successes have obtained in the presence of these hinderances.

When in doubt as to the local condition of a wounded or sutured nerve the surgeon should have no hesitancy in making an exploratory exposure of the trunk in question. By this operation many weeks or months of time may be saved. When in doubt suture, may be offered as a rule and guide. While time may be relied upon to remedy much, both in the removal of scar tissue and in the development of new nerve through gaps made by wounds, yet surgery may be called upon in the aid of these natural processes.

Above all the judgment of the neurologist is required, both to determine the extent and character of nerve injury in cases in which the wound of the nerve is not exposed, and to define the prognosis and progress of restoration. Because of the surgeon's incompetence to appreciate these things, our surgical literature is defective chiefly in this.

## THE EXECUTIVE ELEMENT IN THE TRAINING AND SKILL OF THE ARMY SURGEON.

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I DESIRE to say at the outset that in preparing this paper I have been confronted with the thought that I am addressing myself to men who are many times better able to speak upon this subject than I am.

In the language of one whose effort has often been held up as one of the very greatest examples of oratory, "I can but tell you that which you yourselves do know," and yet matters that are well known are sometimes benefitted by formal statement and discussion. It is desired that these remarks be understood to apply, not to garrison or even department duties, which are already admirably worked out, but to field and division hospital assignments—such conditions as are likely to arise under military operations. Without further explanation or comment I proceed to my first proposition, namely:

I. *The duties of an Army Surgeon are largely administrative.*

This item of executive skill is the one component of which least may have been thought by either the appointing power or the appointee when the assignment to some certain duty or field service was made, but when the work is done and the account taken, *it* or the *lack* of it will always be found to have entered largely into the grand resultant of his success or failure. Especially is this true of those duties pertaining to the higher ranks. A man may be preeminent as a sanitarian; especially skilled in bacteriology and biology; a peerless surgeon; and withal he may be thoroughly conversant with the requirements of the Regulations, and yet not fulfill wholly the expectations and wishes of the Surgeon General when military operations are under way.

Reports of the sanitary condition and low death rate of troops now in the Philippines, show that both Medical and Line officers are making good use of knowledge gained in the severe schooling of the past four years. That this may be best preserved; that the knowledge and experience of veterans of the Corps, unfortunately so soon to retire, may accrue to the newer men coming into the Corps; and that still further advances and still better methods of training may be evolved is precisely the object of this paper.

A man is only what he is trained to be. However much genius may sometimes come to the aid of the unschooled, it can never take the place of training. It is too uncertain, too rare, and could not, even if possessed, fit a man for these duties. By *executive faculty* is meant that habit which consists, not in doing the work one's self, but in seeing that the right man does it at the right time and in the right way. Nor, still further, does it consist in *giving orders*, but rather in establishing such a condition of affairs that each man, whether the range of his responsibility be wide or narrow, gives the orders suitable to his especial station, and sees that they are executed. It is not always the man who *works the hardest that accomplishes the most*. Too much depends upon the direction of his efforts—his *business tactics*—in other words, his appreciation of the *executive* principle. It fosters the *esprit de corps*, and by it a man is able to wield strong influence where he is not. For this reason it is essential in the putting into effect of those complex methods used to prevent the spread of contagion. Chance and uncertainty must surely be as far eliminated as may be, for direful possibilities are hovering too near. Therefore,

II. *The duties of the Army Surgeon demand, and requirements fully justify, the widest practical training it is possible to give him.*

And this is profoundly true, for the following reasons:

A.—The enemy encountered by the Medical Corps is the deadliest one of all. It has become well established as a rule that armies in active service suffer much more and sustain much greater losses from disease than from wounds received in battle. But the extent of this disparity does not seem to be understood and appreciated by any but army surgeons themselves.

To arrive at a fair estimate of it, it is obvious that figures relating to wars other than those of recent times are useless. Taking note of those at hand of the last half century we find that the ratio of deaths from disease to that from casualties is approximately as follows:

In the Crimean War, 1854.....	4 to 1
In the Civil War, 1861-5      (North).....	2 to 1
In the Civil War, " "      (South).....	3 to 1
In the Austro-Prussian War, 1866.....	1½ to 1
In the Franco-German War, 1870-1 (exception).....	½ to 1
In the Russo-Turkish War, 1878.....	7½ to 1
In the War of the French in Madagascar, 1896.....	560 to 1
In the Spanish-American War, 1898.....	about 8 to 1

Leaving out of account as a monstrosity, the Franco-Madagascar war, the general average of these figures is 4 to 1.

Again,

B.—Given a disciplined army, the *effectiveness* of troops in action is measured largely by their health and vigor, and this depends in no small degree upon sanitary regulations. Disregarding for the nonce the humanitarian phase of the question, the dead soldier, as a burden, is only exceeded by the sick soldier. The same also may be said of him as a breeder and disseminator of contagion. As has been well said, "The infirm soldier cripples the command of which he is supposed to be an effective instead of a burdensome part, and the care of him requires men, money, and transportation facilities needed for other purposes. Had officers and men, during the mobilization of the army for the Spanish-American war, been as vigilant and careful in the preservation of their own health and vigor as they were eager to get to the front, it is safe to say that the non-efficiency rate and the total death rate would not have been anywhere near as large as they were.

With better executive training, more authority must come to the Surgeon in sanitary matters. He must not be guilty of too much official modesty, but must *magnify his office*.

C.—The great problems of the etiology, transmission and prophylaxis of disease epidemics, so destructive to life in military movements, are worked out wholly by the Medical Officer. While it may be too early to say absolutely that these questions concern-

ing yellow fever have reached their final solution, yet indications point decidedly that way. And if our country received from the Spanish-American war no other bequest, it would be amply justified by this one splendid result.

In view of these facts recent legislation concerning the Medical Corps must be regarded as "shortsighted" to put it in mildest terms.

Provision is made by the government for the education even from boyhood of the Line officer, but the Surgeon must first educate himself and then none but the best need apply. Should he then and with equal financial and official responsibility be offered only a volunteer commission, and be unceremoniously dropped when the government is through with his services, when he is to serve side by side with a Line officer of the permanent establishment, whose longevity pay and retired pay are guaranteed, and whose commission cannot be taken away except for cause?

Again, the Surgeon is exposed, not only to the dangers of the firing line in common with his brother officers; but also to those of infection and contagion, fourfold more destructive as the figures show. Should then a niggardly policy be pursued toward him? That legislation which cripples and stultifies the Medical Corps takes rapid steps toward diminishing the effectiveness of the Army.

In Captain Munson's splendid work on Military Hygiene, and more explicitly in that very excellent chapter on "Military Mortality and Morbidity" is shown by a painstaking study of the death and non-efficiency rates for very many of the more recent wars, an array of fact which we have no right to regard as indifferently and discuss as coolly as we do. These serve to confirm the conclusions of one's more limited observations; namely:

- (a) That periods of inactivity during hostilities are more destructive to both the health and the life of the soldier than are times of actual campaigning;
- (b) That the death rate from disease is apt to be several times larger during hostilities than it is in times of peace; and
- (c) That the increase in both the death and non-effective rate even in the ranks of the Regular Army, is due almost wholly to the increase in infective diseases, general and local.

These conditions are accounted for partly by the fact that, with the raising of new regiments, unseasoned troops are brought into the field, and with them come surgeons and assistant surgeons whose training in sanitary and military matters is not what it should be. But they can not thus be fully explained, for the statistics given by the author just quoted show nearly the same ratio of increase for the Regular Army.

If some means could be devised or methods adopted for constituting and training a Reserve Medical Corps it would pay; for an untrained, or even a half-trained Medical Officer is by the very nature of things an *ally* of the enemy.

Some of the causes which operate to produce the results above mentioned are not under man's control, such for instance as inclemencies of the weather, diminished vitality from exposure, and unhealthy locality,—but other causes ought to be.

I do not propose to arraign nor yet to offer apology for the administration of any Medical Officer. The record speaks, and generally if not always tells of good and faithful work under the conditions. Each did the best he could, but most of us, I fancy, are conscious of a feeling that we could do better next time. Might we not have been so trained that we could have done better the first time? And this leads me to say,

III. *To the greater degree of authority of the Army Surgeon should be added a better Executive Training.*

The Army Medical School is a splendid conception. It serves to make more thorough the professional skill and the scientific training which was and is and ever shall be of *paramount* importance. But it reaches only the younger men of the Corps, and the demands of the service are such that comparatively few can take the course. If its special instruction in military hygiene and sanitary subjects could be supplemented by a careful study of the duties of management of some of our large city and state hospitals, with complete report of such study, its benefits would be multiplied. Much advantage would *also* accrue to both the Department and the *Surgeon* if the latter could be detailed to make brief but thorough examinations into and report upon the business methods and details of management of large civil

hospitals, and even of the modern department store, as well. I once asked the head of a great department store, the stock of which was being constantly distributed by an army of delivery wagons and repleted by train-loads of boxes, how he managed this enormous business without visible jar or loss, and he replied: "System, Doctor, system! That is our secret, and we could not run a week without it."

The Surgeon ought to be able quickly to establish a Regimental, Field or Division Hospital on a business basis. He should be allowed to look after the transportation of his own supplies, and should be held responsible if they are not at hand when needed.

There is a serious *limitation* to the efforts of the Surgeon which ought to be mentioned here. The wisdom of the Hospital Corps, as a separate arm, is evident. It has been oft demonstrated. But the Surgeon, of whom results are expected, is not allowed to employ or choose his men. They are assigned to him. Nevertheless his success depends to a fairly large degree upon their individual intelligence and faithfulness. In the Regiment the Company is the unit. But in the Hospital Corps the Private is the unit.

He is the ultimate representative of the Surgeon. In his first aid duties and at the bedside more than ordinary mental alertness is required.

Therefore he should be of a higher grade of intelligence and stronger purpose than the average man, and to secure this should be better paid.

The Surgeon cannot be too exacting in the training of the Hospital Corps and he should be allowed to weed out those found incapable of receiving the necessary training. Executive ability consists quite as much in getting rid of an incompetent man as it does in calling forth the best services of a good man.

Understand me, I do not mean to insinuate for a moment that all these things,—and better than these—have not been considered by those in authority of the Medical Department. But when you and I begin to talk of them, to urge them, to discuss and to educate, then we shall become the better able to hold up

the hands of those who strive for better things, and to help to secure the necessary and much-needed legislation.

With a Military General Hospital as now, in the West, and another one or two in the East, it would seem that by short-term assignments to the management of the different departments of these, each Surgeon might be given the opportunity to study the various questions of hospital management and sanitary evolution, and to determine for himself and develop his own resources.

And if pending legislation should ever be enacted, as it probably will be sooner or later, so that the various organizations of State Militia shall become a National Guard in fact as well as in name, then the men and officers of this National Guard who contract disease while in the service of the United States, should be allowed the privileges of these general military hospitals. Medical Officers, also, of the National Guard should be allowed the privileges of instruction in these hospitals on the same terms as other officers of the National Guard are to be allowed the privilege of the various service schools of the U.S. Army. The advisability of such a measure is shown by the fact that during the Spanish-American war a considerable per cent of the Medical officers who entered the service from civil life had been attending some militia organization.

To the possible objection that the measures herein suggested would not be practicable, I answer: Anything is practicable which will bring about improvement commensurate with its cost. For you and me, that is practical which will make of us the best possible men. And for the Government, that is practicable which will give it a Medical Corps of the highest degree of efficiency, even though the cost be great, which, however, it would not be in this case.

To the objection that few if any would ever put into use such training I answer: Not all might, but some would be certain to. Warships of every nation have rusted and rotted down without ever going into action but no government stops building warships for that reason, and it would be difficult to prove that those not in action have never done any good.

Infinitely more to the purpose is it to train well in all his



faculties, the Army Surgeon, for his wisdom, his training, his skill will crystalize into knowledge of better sanitary regulations and better methods, and will become the traditions and habits of a better, because a more effective military organization.

·DISCUSSION.

Lieut. Col. VALERY HAVARD, U.S.A.:—I am certain I heartily favor the education of medical men so far as it is possible, and all classes of medical men. Our regular medical officers already receive a practical training at a special school, and I do not see why this training should not also be imparted to the civilian doctor or contract surgeon. We know that the great majority of our soldiers are in the hands of civilian doctors and contract surgeons; that the number of medical officers is always too small to answer the demand. Now our soldiers are entitled to the very best medical attendance, to the very best skill of medical officers, and I am afraid that they do not get it, and that a very great injustice is done on that account. As we know, a civilian or contract surgeon may be a very skilled practitioner, he may be a very experienced doctor, but what avail will it be to him if he does not know how to draw a ration, to select a good cook, if he does not know how to prevent disease? I know that in Cuba where I had charge at one time of 25 or more hospitals, I do not believe there were more than three or four in charge of regular medical officers. All the others were in charge of contract surgeons, most of them excellent men, but without this training, with little practical knowledge of their duties as medical officers—most of them good physicians but indifferent medical officers, with no idea of their duties as sanitary officers so as to prevent disease and get everything that was obtainable for their patients. And in that way, as I said before, a great injustice has been done and will continue to be done to our patients in the future unless our civilian doctors or contract surgeons receive a special training in the duties of medical officers in addition to their professional knowledge. I do not see why a school of that kind could not be established and maintained here, for instance, in connection with the regular school, or as part of that school already established for regular officers. Certainly it is very necessary if not indispensable, and would certainly be of the greatest benefit to our soldiers, especially in the field where they are in need of attention and entitled to every care.

The PRESIDENT:—Major Appel has charge of the Sanatorium at Fort Bayard, a very extensive hospital. Perhaps he would enlighten us as to its administration in the line of discussion of this paper.

Major D. M. APPEL, U.S.A.:—I hardly understand in what respect the President desires me to discuss this paper in connection with the Sanatorium.

The PRESIDENT:—From the administrative point of view.

Major APPEL:—The General Hospital at Fort Bayard was established for the treatment of a special class of diseases. It was an entirely new idea to have a hospital for the treatment of cases of tuberculosis, and the order establishing it said that it shall be conducted according to rules and regulations prescribed by the Secretary of War. Shortly after the hospital was established, the Surgeon General visited it and after inspecting it, noting the administration and organization, I asked him when I would receive the rules and regulations from the Secretary of War,—some six months after it has been established. He informed me that the Secretary of war had delegated him to make the rules and regulations and that he would delegate me. I then asked him for suggestions, and he said "go on." Every rule and regulation, therefore, of the hospital was framed by myself, and it being a special institution for the treatment of a special class of cases the conditions are in many respects unique and peculiar, to which the regulations will frequently not apply. Therefore all the regulations are the result of experience in the hospital. Patients there—differing from those in ordinary hospitals—are expected to remain a long period of time. The large majority are not confined to the bed, and they are divided therefore into ambulant cases and bed-ridden cases. Most of the ambulant cases are apparently as well able to take care of themselves as any one in this room. It is necessary in spite of this to have very rigid rules, disciplinary rules, which would not apply in ordinary cases. These rules apply of course to the general hygienic regime. Probably 90 per cent of the cases are not bed-ridden, and it was necessary to make rules to compel them to live as prescribed. Of course the principal treatment in our hospital is the out-door treatment. The next important factor is the rest, both physical and mental. Probably in no other military hospital would it be required to make regulations to prevent patients from playing poker. It was necessary also to establish a rule forbidding the smoking of cigarettes, establishing the hours when the patients should retire, rules for the length of time they must remain at the table during each meal, etc. All these questions arose and were met as the result of experience. Of course the most important prohibitory rule is that patients shall not expectorate on the ground or anywhere else except in their paper cups. Outside of the special rules it was necessary to establish at the hospital, all the ordinary regulations of every general hospital would

apply, excepting of course that in our hospital we have men who have been discharged from the service, but being military service men who are entitled to the benefits of the soldiers' home, and being in a military hospital they understand that they must submit to military control; but frequently after committing offenses they protest against being punished as soldiers. I have always insisted, however, that they must first suffer such punishment, and then they can leave if they desire; but having voluntarily remained in the hospital as patients they must first submit to punishment whether still in the service or not. There are a great many points in the administration of such an institution. New points continually arise. It is a good school for the study of administration, and the assistants who are in charge now continue the rules that have been adopted in the regulations. We have very few general hospitals in the service and therefore very little opportunity for the medical officer to study their administration. Until the recent war we had but one general hospital, that at Hot Springs, Arkansas. It would therefore be very desirable to establish such a school as the writer of the paper recommended for the instruction in administration of medical officers.

The PRESIDENT: The question of administration might be discussed for the great benefit of the Association by Colonel Nielson, who is the administrative medical officer of the Canadian forces. Will Colonel Nielson favor the Association with his views?

Colonel J. L. H. NIELSON: I feel honored by being called upon by you to address this meeting. I thank you. I doubt whether anything I could say on the subject would be of very great value to my hearers. Our conditions of service are entirely different from yours. Across the border we have a citizen army. We have hardly any regular soldiers. We have an administrative staff and a few regularly enlisted men forming a regiment called the Royal Canadian Infantry. We have two batteries of field artillery, and two squadrons of cavalry. These form an instructional school for our citizen soldiery. We therefore have not large permanent hospitals, not does it call for much administrative ability in our own medical officers who have charge of the small infirmaries connected with these regular soldiers. But should occasion offer, and during our annual camps of training exercise, we have larger establishments of a very temporary nature. We have small field hospitals, and so on, where our militia surgeons receive their annual training as well as the combatant officers receive their training in artillery, in infantry, and in cavalry. This period of training being short it is necessarily elementary. We, however, endeavor to convey to these militia medical officers a fairly good knowledge of what they would be required to do if embodied in case of emergency. We have for

that purpose classes, and the militia surgeons before being confirmed in their commissions are obliged to take a course of instruction in these camps, or sometimes a satisfactory course of training at one of the large military centers. There all these junior officers who have just been appointed gather together and follow a course of seven days. You cannot expect that in seven days they will be very thoroughly grounded in the necessary knowledge of their duties, but they are eye-openers of considerable value; and when these courses are repeated every 12 months, after two or three years of attendance our military surgeons get to have a fairly good idea of what will be required of them were they embodied or mobilized for actual service. In Ottawa next week there will be one of these courses. A number of recently appointed militia medical officers will be gathered there and will follow that course. It consists of nearly ten hours of work a day, practical and theoretical, and at the end of it all is an examination, oral and written, and only after an officer has qualified and has passed with 70 per cent or more of marks will he be confirmed in his commission, and if he fails to pass a first examination he may take a second; but if he fails in that his name will likely be dropped from the militia list. So I do not see that our services are in any way parallel, but I wish simply to emphasize the fact that we are fully aware of the necessity of training for our militia officers in their executive and administrative work.

Captain E. L. MUNSON, U.S.A.:—It seems to me that the remarks of the President of the United States\* this morning were particularly fortunate in that respect. He brought out the necessity for special study along professional lines. He emphasized the fact that administrative ability was of special importance. That is a point which we cannot lay before the general public too forcibly or too frequently. The practitioner in civil life, no matter how good he may be along his special lines of practice, fails as a military surgeon unless he has had special training in the military surgeon's special duty. The doctor in civil life cannot take the place of the army surgeon. He can do subordinate duty in his restricted line of work, but until he has had special training in administrative work he will fail completely in the handling of large problems, in the performance of the very varied class of business which the army medical officer is necessarily called upon to do. I think that the President spoke from his own experience. He showed that he appreciated that a good doctor was not necessarily a good medical officer; and that is the point that we should emphasize, that we must have trained men with troops, and that the doctor does not answer the purpose.

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\*See JOURNAL, vol. xi, page 44.

Lieut. Col. N. S. JARVIS, N. Y.:—This is a subject that particularly interests me because since becoming a medical officer of the New York Guard I have been the senior surgeon of what we consider the most important brigade in a body of 15,000 men. We have in my brigade in New York City about 3,500 men, and the medical officers of that brigade have always prided themselves on having obtained an unusual reputation as military doctors, and that reputation has been kept up to this day. Within the last two or three years the legislature has passed some laws and regulations requiring a fairly rigid examination for appointment as medical officers. It consists, first, as to the officer's physical fitness; second, a so-called civil service examination; and third, a professional examination. The latter also includes an examination in military hygiene and general sanitation. Now the great majority of us as students in medical colleges learned nothing of military hygiene—I am certain I never learned anything about it, it was not considered at all. There are very few colleges in this country that teach the subject of military hygiene, so that however competent, however intelligent the doctor may be who is nominated for a commission in a New York regiment, he rarely knows anything about military hygiene; so that if we applied the limitation of 70 per cent in order to receive a commission in a New York regiment we would get no medical officers. As far as their knowledge of medicine is concerned very few are incompetent. So it has been our unfortunate experience to reject this winter one very excellent man. Now I have by virtue of being the senior medical officer carried out the rule of sending for the young doctor as soon as his name is submitted to the board and informing him that he would be examined fairly rigidly on military hygiene, that we had to comply with the regulations, and in order that he might have plenty of time to prepare himself we would postpone the examination for one or two months if necessary. Of course his commission would be held up during that time; and I have gone so far as to designate works that he should look up, all of which can be obtained in the Academy of Medicine. So by following that routine we have passed quite a number of competent men—at any rate, they have a foundation upon which to work. I only mention this fact because it is rather new in our State, and ours is the only brigade in the State that has a medical examining board, and I made up my mind that as long as I am president of that board I would see to it that no man passed who did not know something about military hygiene, at least in a theoretical way.

Captain A. R. JARRETT, N. Y.:—The evident desire to impress upon our minds the necessity of knowing as much about questions of administration as we know about medicine hardly

strikes me as the proper thing. It seems to me that the first and primary aim of the medical man is that he should be a medical man, that his knowledge of medicine and surgery should be so far superior to and above his knowledge of administration that the officer and soldier with whom he comes in contact and with whom he must treat will have that confidence which mere knowledge of administration would not inspire; and I have noticed that a great many officers of the line have been very much more impressed with the idea that the medical officer was typically a first-class surgeon or a physician than that he was a man who knew more or paid more attention to the administration of his office. I think the patient will be far more benefited by his knowledge that the officer paid more attention to the treatment of his patient than to the correct signing of a paper or of straightening out some tangle with reference to the drawing of a ration, or the issuing of clothing, or of the disciplining of a man, and would I think go a greater way toward helping the patient to recover than if he thought that he had more ability in the line of administration than he had in treating the patient. My attention has been called to that frequently on account of the line officers saying to me that they notice very often that after a doctor comes to be a captain or a major he has a great deal more interest in the paper work or the work of administration than he has in the practice of medicine; and that has been brought to my mind on account of the great stress that has been laid upon the training of an officer chiefly in the administrative part of his work. A great deal of that has been done very faithfully by the hospital stewards, who help out so wonderfully the medical officer; but at the same time, without wanting to dissent for the sake of dissenting, I feel it is a great deal better to think of myself trained more as an able surgeon and medical officer and have the admiration and respect that I would produce by my ability than to have the soldier feel that I was paying more attention to something that is outside the line he expected me to do.

Major A. H. BRIGGS, N. Y.:—One word only to correct a statement of Colonel Jarvis'. I believe he stated that the First Brigade was the only brigade in our State that had an examining board for medical officers. Inasmuch as that remark will be crystallized in our report, I wish to say that the Fourth Brigade of the State of New York had a medical examining board five years before the legislature passed that bill, and every medical officer is rigidly and thoroughly examined as to his qualifications, and has been for several years.

Major AZEL AMES, U.S.V.:—I hate to have occasion to differ from my very dear comrade [Capt. Jarrett] in his conclusions on any matter, but I am not wholly in accord with the expression he has just made. I don't know but that the matter resolves it-

self a little into the old question that used to be agitated in the debating societies of the country: "Which is the more important, the hen that laid the egg or the hen that hatched it?" I do not know that it has ever been settled, but I do know that both were needed; and I do know, and you all know, that executive capacity and scientific ability must go hand in hand or both fail. The simple fact is that there is no better word or expression in our language than that of applied science. We must have our Sternbergs, our Reeds, our Carrolls, our Bordens, our Appels, and all others who are hard at work on the scientific features, because those are the basis knowledge; but who is going to apply these things? I remember a very dismal time in an experience in the campaign of the Gulf, in 1863. The regiment marched into a field to camp for the night in two inches of water, and the men had to get along the best they could. They had to stay there two or three days. We had some capital surgeons; they embraced good, loyal men whose names you would recall. But there was just one man in that outfit who knew enough to drain that field. He had the practical sagacity and the required knowledge to put a lot of men at work to rig up an Egyptian pump and drain that field, and in less than eight hours he had that field dry and was throwing up a trench around it. That is the sort of practical sagacity it seems to me we most need in times of emergency for the welfare of an army quite as much as whether or not this, that or the other bacteria or bacillus or some other unknown cause is at the bottom. You cannot have too much knowledge, that is impossible—just as it is impossible to have an over-production of wealth; you may have over-distribution but you do not get over-production of wealth. It is true that if you have not the knowledge you cannot apply it, but what is the knowledge worth if you cannot apply it? I have had an experience covering two wars, and I want to express my very cordial appreciation of Dr. Goltra's paper as being along lines of practical development. I remember that our honored President said to me in Porto Rico one day that "In the regular army, especially the medical corps of the regular army, we have a different line of thought, we use a different language to a great extent, have different ideas from our brethren in civil life because our life is so largely a matter of regulations, training, and of limitations; while you men who come in from the larger life bring in a freshness and a different range of thoughts which applied to our own oftentimes help both." And that is so I think. The department store idea is not such a bad one after all. There are business elements, there are capacities for great and effective work along the lines of system developed in these great caravansaries of industry, that we need, and if we can apply them, so much the better for the service and so much the better for humanity.

## SOME POINTS IN THE TRAINING OF HOSPITAL CORPS SOLDIERS.

BY CAPTAIN FRANCIS A. WINTER.

ASSISTANT SURGEON IN THE UNITED STATES ARMY; LATE MAJOR  
AND SURGEON OF UNITED STATES VOLUNTEERS.

THERE are many lessons which have come to the Military Surgeon from the Spanish-American and Philippine wars, and one subject which has gotten a pretty thorough elucidation is that which looks to the provision of suitable care and attention for the sick of armies in the field. The prime element in this provision must necessarily come from the personnel of the Corps, which is charged with the duty of looking after sanitary matters, and this must serve as my reason for selecting as the subject of this paper, the rather threshed out subject of Hospital Corps training. I do not approach the subject, with any very sanguine hope that I am going to be able to contribute any thing emphatically new, but it is rather my desire to set forth some of the observations and opinions, which have come to me, in the practical handling of the subject during the past three years.

I would first invite your attention to a consideration of the matter of Litter and First-Aid Drill. Like most military evolutions, the results to be obtained from this particular feature of Hospital Corps training, reach very far beyond the mere facility of carrying out a routine, and, as a part of a general training it has a very great deal to commend it. I think that a great many officers have questioned the benefit coming from it, as being rather small, considering the amount of time necessary to the perfection of the average soldier in its details. It does involve no inconsiderable study and practice to master all the details of the drill regulations, and there is a good deal to confuse the beginner, and make him think



that he has struck a rather complex affair, when he first goes at it.

I have heard many discussions as to this question of benefit, and our friends of the Line have had much sportive dalliance with many of us, over our hypothecations of injury, etc., in the case of our supposedly "wounded." At the same time there are none of these jocular scoffers, who have seen the practical workings of the system on the battle field who are not willing to concede the immense amount of real good which follows the trail of a Hospital Corps detachment, which has been well instructed in the handling of wounded, litters, etc. One of the most signal instances of this revulsion of feeling, of which I ever heard, happened in the case of a Cavalry officer, who was in his way an iconoclast on the military features of the Medical Department, as elaborated at his station. This officer was a participant in an Indian fight, wherein this same butt of his "pretty wit," proved itself, by saving the lives of a good many men of his regiment on the firing line. When he got back to his station he had seen the good which follows thorough training, and he became a pretty thorough and enthusiastic convert to first aid drill and all that it implies, when it is carried out properly. I have heard that officer say that he was not only "willing to call that Doctor 'Major', but he can have any other title he wants."

Certainly any one who has seen the clean, neat, precise transfer of a helpless man from the ground to a litter, from a litter to a bed, etc., when it is done by the rule of art, must concede, even on this basis, that the teaching is well worth while. This sort of handling certainly lessens pain and pus, and it saves life. The wounded soldier who receives such assistance in his misfortune is very much to be congratulated. But beyond the result attained in the rapid and merciful handling of the sick, we can reckon upon the sure effect of the drill on the general conduct and efficiency of the man who is drilled. It really drills him, teaches him that he is preeminently an agent, and this realization is good and salutary for him. Show me a detachment at a post, where litter drill is carried

out regularly and profitably and I shall expect, with the utmost confidence, that there will be no dirt in the wards of the hospital, that the beds will have clean sheets upon them, and that the bed patients will have clean fingernails. In my opinion it is very much the keystone of the whole fabric, in the making of the sanitary soldier, and its results are, as I have said, very far reaching in the promotion of general efficiency.

Nevertheless I think that it is possible to overdo the matter of this drill and make it an irksome affair, begetting in the mind of the soldier a distaste for the drill hour, which is almost insupportable, and fostering in him a spirit which makes him indifferent to the instruction he receives.

The vast majority of the men we attempt to teach are receptive up to a certain point only, and most efforts to carry them beyond the rudiments, result very unsatisfactorily, both for the pupil and the instructor. In this connection I shall not soon forget the soldier who told me, with great satisfaction to himself, "that wounds of the abdomen were not *antiseptic*, because there was *facial* matter in them."

It is often very difficult to tell just how far one may go with propriety, and avoid getting beyond the faculties of the men who are listening to his instruction. A too frequent recurrence of instruction in first aid work, implies a very oft repeated reference to the same thing, unless the subject is amplified beyond the point where the comprehension of most of our men ends, and then, of course, the work becomes at once flat and unprofitable. I do not think that a daily drill of an hour will hold the interest of the men, who have learned the essentials of first aid, because of the endless iteration of the same thing, over and over again. The only remedy to this satiety, lies in an amplification of the subject, and as I have said this is apt to prove a dangerous expedient. It is a good practice, I think to avoid more than two first aid drills in any one week. The two hours, properly employed will perfect the average man in the things he ought to know, and the subject will not become a bug-bear to him.

I do not know of a better system of teaching first aid, than the old method by means of tags applied to the "wounded,"

and I think that the very great importance of this matter of tagging should receive emphasis, in our instruction; proper tagging facilitates to such a degree, the final handling of wounds, and is of such incalculable help to the surgeons in the hospitals, at the rear of an army.

It is my opinion that we make an error in our first aid, instruction, by failing to teach the man to act more as a unit. In reality, our unit is entirely too much the squad of four men and not sufficiently the individual man. Accustomed as the soldier becomes to the cooperation of his three fellow squad men, he is apt to take on a considerable degree of dependence upon them, and things are prone to go awry in his estimate, when there is any disruption of the established order of things. My limited experience leads me to believe that in the thick of a fight, the squad of four goes to pieces very uniformly and rapidly, for the simple reason that it is entirely too cumbrous a unit. The individual hospital corps man is more or less of a luxury in the immediate vicinity of the firing line, simply because the proportion of hospital corps men to line soldiers is so small.

I would therefore attempt to impress the fact that the individual himself, rather than the squad is the factor of real work and good on the battle field. Put one man at a fracture of the tibia, for instance and he is rather nonplussed, unless he has been required to meet just such contingencies in the course of his training. The handling of such cases is very much nearer the ideal, when it is done by four men, but if there be any thing, singularly conspicuous by its absence from the vicinity of the average battle field, that thing is the ideal.

Again the Medical Officer is so often hitched on to a flying column, with only one hospital corps man that the cultivation of the individuality of that one man is a matter of very great moment, to that particular Medical Officer. I am sure this point needs no emphasis, to those of you gentlemen who have been after our recalcitrant "little brown brother" in the tropics.

The training of the ward man is of great moment. The trained female nurse has become so much a fixture in the mod-

ern hospital, that we are all rather prone to conclude that first rate conditions are only possible of attainment, in her presence. This opinion comes to us very naturally, for all modern civil hospitals are supplied with them, and their work in these institutions, is manifest in the general air of nicety which pervades them. While I am a strong advocate of the female nurse under most conditions, I am none the less sure that a degree of pronounced excellence can be made manifest about a hospital ward, with the exclusive use of male nurses, and conditions are such in the military service, that we must rely almost altogether on the hospital corps man to look after the sick.

There is at the outset of this matter an important difference in the hospital-corps man and the male nurse in civil life. The soldier is absolutely under control during his enlistment, and if he does not do just as he is told, there are means of making him do it, and if he is specifically directed in a certain line and kept sedulously on that particular tack, he can generally be made to do things of which he did not at first seem capable. I found this to be true in the Philippines, and the work of my wards went forward with a system, which enabled me to conduct a ninety bed hospital, without any occasion to deplore the lack of female nurses in the institution.

In starting out I think one must select his man, and let him know that as a result of the confidence felt in his intelligence and integrity, he has been chosen as a ward man. The generality of men are pleased with this recognition, and they are willing to heed the instruction given them, to fit them as nurses in charge, after they have passed through a period of service, as understudies.

The man so selected is first impressed with the idea that dirt in a hospital ward is of all human errors the most reprehensible, and unpardonable. A few weeks in the prevention and rectification of this condition, along with training in the matter of temperatures, pulses, etc., permits the man to be advanced a few steps, and so on, until at the end of three months, or thereabouts, promising always that our subject has been an

earnest seeker after correct methods, and has the proper conception of his obligation to do the right thing by his patients, one can go into his ward feeling pretty sure that it is fitted to stand a rigid inspection.

In the matter of this training there are so many little points that one can impress upon his man, with such good results in the general improvement of his attitude towards a sick man. I remember, that it was always a source of great pride with my nurses, that no man sick in that particular hospital, had dirty finger nails, and where one can get a response in such matters as this, he is pretty apt to find that the whole matter of the care of the sick is looked after, in a manner to disarm any reasonable criticism.

Again it is very easily possible to successfully appeal to the humanitarian side of the better class of men, and I seldom, or never had a complaint, declared or covert, even from the querulously sick of the tropics that their treatment, at the hands of the ward men, was not as it should be. I do not wish to be understood as advocating the idea that this result can be gotten out of all hospital corps men. There are some of course, who will never develop, no matter how much effort and how much training is expended on them, but there are always duties about a hospital, to which such men can be assigned, and one can generally find a quota of men suitable to the work of the wards. It is no easy matter to get a status of this kind in any hospital, whether civil or military, and it requires work and plenty of it, to establish such conditions.

I had always thought that it could be done, and my excuse for adverting to a purely personal experience of it, is that I may emphasize the fact, that even in so remote a place as the interior of the Philippine Islands, it is possible to conduct a hospital, using the enlisted man only, in such a way that an Inspector is willing to say that the absence of trained female nurses is not evident, upon inspection.

In the matter of general training, it has often seemed to me that a mistake is made in our scheme of instruction, in that there is not more specializing of the subjects, according to the capacity of the men, whom we are attempting to teach. I

have frequently found that a man with a fair aptitude for one subject, would show an almost total inability to grasp the details of the instruction, in another. Some men, for instance are in a large measure born to the work in wards, while others are unable to present any sort of a showing, even after the expenditure of prolonged effort to implant some idea of the matter in their heads. This applies with especial truth to the question of cooks, and I do not know of a more bootless task than that which goes on attempting to evolve a cook out of a man, who has absolutely no capacity in that direction.

Again there are now, and probably always will be a great many men in the corps whom nature has not fitted for the more refined work about a hospital, I need not mention the quota of men, for instance, who are apparently convinced, if we may judge by their general make up, that it is both unseemly and dangerous to go through life with a clean pair of hands. There are such, and the time honored silk purse and sow's ear matter is not more difficult of solution, than is the problem of refining such an individual into a non-infecting attendant, about a hospital.

Both from the standpoint of intellect and habit there are men, for whom all instruction is of little avail, and some of it worse than useless. Beyond the fact that these men do not profit themselves, by the course of lectures, demonstrations, etc., they act as a deterrent influence on the rest of the men, to say nothing of their dampening effect, upon the efforts of the instructor.

Of course the remedy for all of this lies in the recruitment of only that class of men, who can show the personal qualities necessary to the making of the sanitary soldier, but here again we are hovering about the ideal, and it will never be done.

With a number of men showing inaptitude to such a degree that thorough trial shows their inability to take in the general features of instruction, there is only one course open, and that is to make the best of a bad bargain, and put them at the one thing, which seems to promise the best results. I have seen men who never got beyond a faint proficiency as

cooks police, and I do not know of any reason, why such a man should not be given an indefinite berth in the kitchen, for the prosecution of his specialty.

I think, however that there are many men, who enlist in the corps, with good intentions and who are discouraged by the rather complex situation, which at first confronts them. They look upon the polysyllable terms which are rolled out to them, very much as most of us would look upon the Rubaiyat in the original, and it requires some diplomacy and encouragement to convince them, that these are words of their own mother tongue, and that the case is really not so bad as it might seem at first sight.

I have found that with a little delicate handling many such men have turned out to be enthusiastic and appreciative students. In this connection, I would venture the opinion that in the matter of teaching, more discretion should be left the local authorities, the subject matter being apportioned in such way, as in the opinion of the Surgeon it would do the most good, to the greatest number.

The happy and facile Mr. Kipling knew what he was talking about, when he made his analogy between the non-commissioned officer and the back bone, for it is certainly the man in the position of the First Sergeant, who makes the direction of the commissioned hand, come into evidence. He is preeminently in the position of the Executive and unless he is of the proper stripe, and thoroughly imbued with the idea that his position is an important one, and possessed of the force and intelligence to sustain his assumption of an important part in the management of an organization, there is small hope that any thing, beyond the most indifferent results are going to accrue, to the organization over which he has charge. A well trained, conscientious first-class sergeant is to the Military Surgeon, pretty near to being the noblest work of God, and Providence is distinctly on the side of the man, who enjoys such an auxiliary.

There is no duty falling to an Officer, which, to my mind, is of more moment, than that requiring him to select non-commissioned officers of the right kind. I have seen such

baneful results, follow upon the delegation of grave responsibilities to men who were not fitted to hold the positions given them, whether from intellectual, or other deficiencies, and on the other hand, I have experienced the truly invigorating consciousness of having the right man, in the place where he was needed.

I shall not attempt a detailed citation of the qualities, which in my estimate go to the making of a hospital corps sergeant. This much I may say, that I think we often use too much haste in the selection of men, putting them into the positions before they have had the opportunity to prove themselves. I know of few things of so great benefit to us in this connection, as the regulation, which authorizes the appointment of certain privates as probationary non-commissioned officers. Their official designation is almost too heavy for one man to live up to with propriety, but that, of course, is another story. A man now gets a very good chance to prove himself in the actual work of a sergeant, before he is finally appointed, and it is a good opportunity to test his capabilities.

Some features in the training of the non-commissioned officer have particularly impressed me. In the first place he should have the assurance of the absolute support of his commissioned superior, in all things legal. It is my habit to tell a non-commissioned officer, that his word to a subordinate is as full of force as any human talk could possibly be, and that his stock phrase must be, that "it is the duty of a soldier to obey and then protest to higher authority." It is my belief that this formula is a most excellent stock mixture of words. It has an energizing effect on the superior and the average subordinate is somewhat staggered, when he is confronted with its sententious quality.

Non-commissioned officers will sometimes err, but if they should, it is the worst possible thing for discipline that they be taken to task for it, in the presence of the man who has been affected by the error. That is always a matter to be adjusted at an "executive session," behind closed doors.

The spirit of democracy, which pervades most of our doings on this side of the Atlantic, is very apt to have a per-



nicious influence with the non-commissioned officer, and the tendency of our men to live on terms of the most intimate familiarity with the private soldier, is a bad thing for discipline. In all other armies, the warrant officer is very much aloof from the private, and it is very much to be desired that the same status of affairs should appertain in our own service. I knew a very bright man who was a Sergeant-Major, in one of our infantry regiments, and he told me that in Malta, he, as a non-commissioned officer, had an eligibility to associations, to which no man without chevrons might hope to aspire, and that the line separating the non-commissioned officer from the private, was no less defined, than that which was thrown about the commissioned officer. One can easily believe the contention of these men, that the total absence of unseemly familiarity in the barracks, makes it the easier for the private to heed the dictum of the sergeant on the drill ground. There can be no question, I think about the expediency of discouraging approach to familiarity, on the part of inferiors in the military service, just as it is discountenanced in all other business enterprises, where there is a difference of status, among the personnel.

I think a great deal can be done towards the improvement of any detachment of the hospital corps by the practice of making the position of a non-commissioned officer a desirable one, in every possible way. It should carry a large degree of personal liberty, and the officers' supervision should be exercised in such a way, as to show the greatest degree of confidence, in the man who is being looked after. An incompetent man, or one who is recreant to his trust, will show his true make up, in a very short while, under such latitude, and the knowledge that non-commissioned officers are treated with the degree of consideration, involved with this policy, will prove the best kind of an incentive for the privates of the detachment, to fit themselves for the examinations preliminary to promotion, and this of course, involves the idea of general efficiency in the detachment.

It is to be hoped that in the event of another war, we shall be able to get a better class of men as non-commissioned

officers than we had in the early days of the Spanish-American disturbance. The selection of so many men, unfitted by reason of short service, to exercise any sort of command, was one very trying feature of that situation, and it seems to me that we should have done better, had our selections been more limited to the men who had had some previous service in the Corps. It is certainly a very grave mistake to take a man, who is in no sense acquainted with things military, and invest him with the responsibilities and privileges of a hospital corps sergeant. The fact that a man knows something about drugs is in no sense a warrant that he will either prove amenable to discipline himself, or be capable of enforcing any order in a detachment. I think that we had many men in the Corps at the outbreak of the Spanish war, who, while not thoroughly versed, in the more or less technical details of theoretical instruction, were still capable of exerting a very creditable control of men. A man absorbs a great deal of this, by the attrition of mere length of service, and his example is worth a great deal, especially if it be bolstered up by the authority, which goes with a pair of chevrons.

There is no subject of greater import in the military hospital than the matter of instruction in cooking, and there is none, from which less result is to be expected in the average detachment. It is generally a haphazard sort of an experiment when a man is put into a kitchen, and the chances are that he does not want to be a cook, and no amount of persuasion and pay, is going to make one of him.

It seems to me that a remedy for this condition might be found, in the establishment of a central school where cooking could be taught, to the exclusion of other things. It is certainly much of a desideratum that some measures be taken, to provide a corps of men, with some competency in this direction.

It seems to me admissible that I might say a word, at this place, on the matter of recruiting for the hospital corps. I am of the opinion that our present system of enlistment, for the hospital corps, has some material defects. A great many of the men whom we get direct from civil life or by re-enlistment, are in no way fitted to do good service in the particular branch, for which they have enlisted. It is really a hard matter to make a good sanitary soldier, for he has got

to learn a great many things, and if he has not the necessary intelligence, he makes one of the worst possible investments for the Government.

Many of the men who have had service in the line of the Army, re-enlist in the sanitary branch, impelled to do so by the idea that it is a soft place, where one can rest on the laurels of a three years tour in the line, with little to disturb the serenity of his "*otium cum dignitate*," beyond an occasional signature to a pay voucher, and the obligation to spend the pay when it has arrived. The most disgruntled men I have ever encountered in the service have been soldiers, who made good line soldiers, and came into the hospital corps with the idea that service there was to be one delightful period of relief from guard and most of the other vexatious elements of the military service.

It requires some special qualifications to form an opinion as to the worth of the average man, as a hospital corps man, and I think that the matter of enlistments should be confided entirely to representatives of the Medical Department.

I have at various times encountered men who had represented to the recruited officer that they were students of medicine. Most of these men are rank frauds, and if they have learned any medicine at all, it is probably of that particular variety, not by any means unknown in the United States, which they might better unlearn. I am always on the defensive when a man tells me that he has attended a course of lectures in some medical college,—generally at some point in the progressive West. It has happened to me that the most cursory inquiry showed the claim to be absolutely false.

The system of transfers is beset with many difficulties, not the least being that the average company commander does not want to lose his good men, even for the sake of a possible benefit to the hospital corps.

The Corps has done excellent service in the recent disturbances, and I fancy that the best work was uniformly done by those detachments which had received the most instruction. The end accomplished by this instruction is a truly gratifying one, and the man who works with his detachment gets a recompense, which richly rewards.

## THE TREATMENT OF YELLOW FEVER.

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THE treatment of yellow fever is a subject of very great importance and secondary only to the question of prophylaxis or prevention. We are now able, by promptly instituting the proper measures, to control the spread of this disease, and if the treatment of the persons already affected be successful, the excitement and panic that so frequently follow its invasion may be averted. It is important to bear in mind that the disease is one of short duration, and if the patient's strength and vitality can be maintained throughout the critical period his recovery is practically assured, provided, of course, that he was previously in good health and free from organic lesion.

Let us first review the treatment pursued by some of the older authorities and then, aided by the light of modern pathology, consider what modes of treatment will be simplest, safest and at the same time afford the best prospects for success to-day.

One of the earlier English writers on this subject, Richard Towne,<sup>1</sup> began his treatment by ordering the patient bled, to the extent of eight ounces, and that was to be repeated once in six or eight hours as long as the symptoms were not abated, lessening the quantity drawn each time. He then administered an emetic dose of squill, ipecac or tartar emetic. He directed that the patient be given liberal quantities of diluting, refrigerating and sub-

acid drinks made of oranges, lemons, tamarinds; or the mineral acids in barley or spring water. He states that lemon juice diluted aids diaphoresis. He allowed slightly acid fruits, roasted plantains and bananas, guava jelly, etc., with barley water ad libitum. Toward evening he directed a clyster of cream of tartar and manna, and at night twenty-five drops of laudanum.

In the second stage he repeated the bleeding and applied wet cups and blisters. He insisted upon the necessity for absolute rest in the reclining position. Meats were forbidden and he only permitted panada or water gruel sweetened and slightly acidulated. Cooling and lenitive clysters once in eight hours and a good dose of laudanum at night sufficed for this period of the disease.

In the third or comatose stage he directed that blisters be applied freely to the neck, wrists, thighs and legs, but more especially a large one to the crown of the head, "to invigorate the circulation and give the spirits liberty to expand themselves." "To the soles of the feet," he says, "there may be applied lotions, plasters, pigeons killed and cut open, lungs of sheep, goats, calves, etc." Cordials and volatile salts were administered to comfort and refresh the languishing patient. Camphor in six-grain doses gave him remarkable results in the later stages, when the condition was critical. Finally he resorted to the use of powerful purgative clysters.

He believed, with others of his day, that the poisonous element was largely an excess of bile in the circulation, and blisters were frequently used, because the serum withdrawn by them being tinged with bile, it was thought a certain amount of the poison had been extracted with the serum. Active purgation was used to remove and prevent reabsorption of the supposed poisonous material excreted into the stomach and intestine.

Dr. Henry Warren,<sup>2</sup> who treated the disease from 1734 to 1738, condemned the use of calomel, emetics, purgatives and blisters and advised the use of mild laxatives in repeated small doses for several days. By these means he observed that putrid feces were expelled, the secretion of urine increased, the intestinal glands were cleansed and much of the corrupt and infected serum carried off. He wisely said that great care should be had

to keep up nature's strength and spirits by giving now and then a little warm Madeira wine, Canary or such cardiacs as were not too inflaming. In his experience the nitrous and sub-acid remedies disturbed the stomach.

When seeing the patient for the first time he ordered a moderate bleeding, and that he be then covered with a blanket and made to perspire freely for twenty-four hours, or as long as the fever lasted, by the use of posset drinks. After the first day he allowed chicken broth as often as the patient desired it. He always found this useful and necessary to support the strength and counteract the exhaustion that would follow the free sweating. In addition he allowed now and then a glass of Canary or Madeira wine a little diluted, besides gruels and panadas with wine added to them, or sack-whey made richer than usual, and similar forms of light nourishment. If there had been no stool for three or four days he ordered a clyster of fresh milk and brown sugar or small doses of rhubarb and manna.

If there were frequent stools at a later period he deemed it of the highest consequence to suppress them promptly by the use of clysters containing Venice turpentine, Venice treacle or burned wine or brandy. He attached the greatest importance to the use of sudorifics.

Dr. John Redman of Philadelphia, the first president of the College of Physicians of that city and a teacher of the celebrated Dr. Benjamin Rush, read a paper before that body in 1793, in which he described his treatment of yellow fever in 1762. He is said to have been one of the most advanced and successful practitioners of his time.

He began his treatment with one-dram doses of that much neglected drug, Glauber's salts, repeated every hour or two for four, five or six doses until there were free evacuations. He saw the advantage of this in 1741 or 1742, during a previous outbreak, while he was a pupil to Dr. Kearsley, who had saved most of his patients by the use of it, while others who began with an emetic lost many or most of their patients. At the same time he ordered wine, vinegar-whey, thin gruel or barley water, raisin drink with wine, etc. On the second and subsequent days he administered

one or two doses of the salts to insure having two or three stools a day. Along with these he gave teaspoonful doses of a neutral mixture to keep the skin moist. In the beginning he applied over the stomach an anodyne plaster of theriac, etc., which was renewed at frequent intervals.

The above-mentioned drinks were alternated with pleasant herb teas, water acidulated with the mineral acids, lemonade, weak cold punch, fruit waters or weak wine and water. In hemorrhagic cases he used mineral acids in all drinks and in addition gave red wine and water with a decoction of Peruvian bark and Virginia snake-root. He avoided venesection and emetics and believed that most other practitioners did the same, because of the disastrous results they had seen follow these measures in the former epidemic.

After the third day wine was given more freely and beef tea or chicken broth was added to the diet which was regulated by the taste and desire of the patient. Tea, coffee and weak chocolate were permitted under the same condition of their being agreeable to the patient. He laid stress upon the necessity for discharging the morbid matter as fast as possible, first by the *primæ viæ* and then by the pores of the skin and urinary passages, at the same time stimulating the body by means of strengthening nutriment. He attached great importance to the use of mineral acids and sulphate of soda. His general line of treatment was rational and based upon sound principles.

Hillary,<sup>3</sup> who treated the disease in the West Indies from 1752 to 1756, declared that the objects to be obtained by treatment were the following: First, "to moderate the too great heat and rapid motion of the fluids, and abate the too great heat and violence of the fever, in the two first days of the disease, as safely and as much as we can. In other words, to diminish the fever." To attain<sup>4</sup> this end he withdrew blood to the extent of from twelve to twenty ounces on the first and second days of the fever only. He strongly advised against bleeding after the second day, and when it was to be performed the quantity of blood to be withdrawn was determined by the general condition of the patient. The second indication was "to evacuate and carry out of the body

as much of that putrid bile and those putrid humors as expeditiously and as safely as we possibly can."

He regarded the administration of emetics, so frequently practiced then, as dangerous and likely to prove disastrous. He ordered large draughts of warm water. After the vomiting excited by these had subsided he gave a grain or a grain and a half of extract of opium and nothing more was to be taken into the stomach for two hours. If the patient had had no stool a purgative clyster was given as soon as the vomiting had subsided and before the opiate had exerted any effect, and six or eight hours later a gentle purge. The treatment then followed was the administration of an infusion of Virginia snake-root with elixir of vitriol and Madeira wine. For nourishment barley water and wine- whey were given often and in small quantities during the first two days of the fever, and after the third day the quantity of wine was increased.

Dr. Brown of Boston<sup>1</sup> began his discussion of the treatment by citing from a letter written in September, 1798, by Dr. Mitchell, professor of chemistry and natural history in Columbia College, New York. Dr. Mitchell stated that in cases with symptoms of gastritis, anorexia, vomiting, etc., he had obtained happy results with watery solutions of lime, potash or soda, aided by a cathartic, such as castor oil, Rochelle salts, etc.

He wrote that the alkaline remedies were much used by the physicians of New York during the epidemic of that summer. They allayed anorexia, nausea and black vomiting. In some cases with high fever, dry skin, a full pulse, delirium, etc., he pronounced blood-letting a grand remedy and in many instances indispensable.

He exercised an admirable discrimination in the practice of venesection, in which regard he differed from Rush and others of his contemporaries, who advocated bleeding in nearly all cases.

He summarized the treatment as follows: At the onset a thorough evacuation by mercurial cathartics, by diaphoretics and by blood-letting; poultices, fomentations, pediluvia, cold and warm bathing, blisters, enemas, etc., according to the indications.



After one or two evacuations he gave mercurial pills in doses of one, two or three grains, frequently repeated, to insure an evacuation every day or every other day. The drinks were to be subacid, diluent or emollient and were continued until after the subsidence of the fever, when he advised wine, bark and other restoratives. The food was to be light and easily digested, generous and gently stimulating; to be given often and in small quantities.

For primary catharsis he preferred ten or fifteen grains of calomel with twenty or twenty-five grains of jalap; calomel was given subsequently in doses of one, two or three grains, as before stated. He cites Warren,<sup>3</sup> who asserted that it was the universal opinion of physicians in Boston that the most efficacious remedy, and the only one to be relied upon, was mercury. That in his observation more patients recovered under this treatment than under any other. It seems that he gave one-grain doses hourly until the patient was salivated, and he claimed by this means he effected a cure in all but two of his patients. Opium was frequently administered with the calomel to retain the latter in the intestine and insure its absorption. He was a strong advocate of the use of mercury in the form of calomel.

Brown tells us that "when there is a full, hard pulse, dry skin, great heat and violent pains in the head, stomach and bowels, bleeding is certainly an excellent remedy, if not a *sine qua non* of a cure." He applied blisters to the back of the neck, under the occiput or over the stomach to relieve pain, nausea, retchings or vomiting. Laudanum was used to quiet the stomach. Blisters were also applied to the temples, neck, back, thighs and arms, "to arouse the system from the torpor, low delirium and extreme debility of the second stage of the disease." Pediluvia with poultices were frequently used to moderate the violent determination of the blood to the head and to bring on perspiration, but for these purposes he preferred the warm bath.

He says that Drs. Rush and Griffiths advised bringing on a profuse perspiration by wrapping the patient in blankets and applying several hot bricks wet with vinegar to different parts of the body, giving at the same time repeated draughts of hot teas, lemonade or weak punch, to be repeated once a day for four or five hours, as long as the fever continued.

Brown used cold bathing during the fever, either by sponging or by dashing the water upon the patient. When the stomach was extremely irritable he advocated the use of cathartic and nutritive enemata at frequent intervals. For this purpose he used chicken or veal broth or water gruel, and if a cathartic effect were desired a tablespoonful each of Glauber's salt, sweet oil and molasses were added.

In the early period large quantities of diluent and sub-acid drinks, such as toast-water, lemonade, tamarind water, apple or barley water, etc., were given, and later these were changed for porter and water, claret or milk and water. No food was given until after the crisis. Then feeding was begun with light, easily-digested foods, such as weak tea or coffee, thin porridge, roasted or baked fruits, chocolate, sago, weak chicken or veal broth.

Lind\* relied mostly upon tartar emetic and blisters together with the administration of Peruvian bark. He attributed great virtues to fresh air, because he noted that sailors often recovered without treatment or care, while patients removed to hospitals died in spite of his best treatment, which was hardly to be wondered at.

Rush, who was a follower of Sydenham, carried the practice of venesection to excess. In a published table<sup>7</sup> he enumerates twenty-three patients, each of whom was bled from three to thirteen times, and from each of whom he drew, in all, quantities of blood varying from fifty to one hundred and fifty ounces. He carried the administration of mercury to the same extreme, for he states\* that he gave to one patient one hundred and fifty grains of calomel in six days. He thought this a large quantity until he read that Dr. Chisholm gave four hundred grains to one patient in the course of his fever, and to another fifty grains at a single dose three times a day.

His general treatment was bleeding, purging, blistering, the use of cold water internally, externally and by means of clysters. He condemned the use of stimulants and found niter and antimonials to be ineffectual. He ascribed great value to blisters and aimed to induce salivation with calomel. He declares that in 1794 he was delighted with the effect of salivation in every case

in which it occurred. As compared with some other physicians, however, Rush used calomel in moderation, for La Roche cites instances in which patients were given from one to several thousand grains of calomel during the course of an attack.

Currie<sup>9</sup> objected to the use of mercury on the ground that it protracted the fever and retarded the cure. He asserted that in all malignant cases in which he saw it used, whether in large or small doses, it hastened the end. He made exception in cases where there was coma with dilated pupils. In these he stated that it had saved many lives when given in large and repeated doses. The treatment by sweating accompanied by cordial and stimulating remedies he regarded as not only unsuccessful but pernicious. Bleeding and catharsis he considered to be of the greatest benefit during the three first days in inflammatory cases. In adynamic cases he asserted these measures did manifest and irreparable injury. The cold bath and the use of wine, bark and opium were all condemned by him. The juices of lemons, oranges, grapes and currants he found to be grateful and beneficial.

Clark,<sup>10</sup> who treated yellow fever in the West Indies in the time of Rush and Currie, was opposed to bleeding in most cases. Mercury was his "sheet anchor." He generally ordered a pediluvium and a purging clyster at first, then a large dose of calomel and jalap, and repeated small doses until a free movement had been obtained. Saline draughts, given while effervescing, checked the vomiting and were serviceable during the first stage of the disease. He encouraged perspiration by giving warm drinks when the vomiting was not too violent. He found that excessive vomiting and purging were generally restrained by opium; he gave as much wine and opium as the stomach could bear; if the purging was free he gave chicken broth with sago or panada, Madeira wine or old hock, and he laid great stress upon giving nourishment and wine frequently. He attached great importance to careful nursing and the necessity for early treatment, and said that in the worst cases or those neglected at the beginning, no remedy seemed to retard or arrest the disease.

La Roche,<sup>11</sup> whose treatise on yellow fever is without doubt the most exhaustive one in the English language, divides the cases according to their severity into three classes.

First, those in which the patient appears to be stricken with death from the beginning. In these no treatment avails and recovery, where it occurs, is due, not to treatment, but to the vital resisting power of the patient.

Second, those cases which are so mild as to recover spontaneously without any treatment, or under the influence of any rational or even irrational management.

Third, those in whom the disease assumes an intermediate grade, whose chances of life or death are equally or nearly balanced, and in whom, consequently, it becomes an object of the utmost importance to apply means calculated to produce a favorable impression, and thereby arrest the dangerous tendencies.

He says we must while watching carefully the course of the disease, prevent undue mischief being done, especially to organs essential to life. We must keep these organs in as healthy a condition as possible—restore, if possible, equilibrium in the play of the functions—reduce undue and dangerous excitement, and sustain the powers of life when these threaten to become impaired or are greatly reduced beyond the point of safety. Beyond this art is of little avail.

He quotes Harrison<sup>n</sup> as follows: "Accidents or acts of imprudence which, in other diseases, are mere trifles, are of tremendous importance in this. The mere getting out of bed has cost many a man his life. A man in this disease, however safe the physician may think him, is hovering between life and death—a trifle may decide his fate." (This fearful truth is too often only sufficiently impressed upon the physician after he has seen a number of deaths occur in patients whose condition would ordinarily excite no apprehension.)

La Roche insists upon the necessity for absolute rest in bed and cleanliness. In cases of the so-called inflammatory type he concludes that the experience of innumerable observers shows that sanguine evacuations—bleeding—and purgation are indispensable parts of the treatment. He says it is everywhere conceded, even among physicians who are opposed to sanguine evacuations, that in the first stage, antiphlogistic, sedative and evacuant measures must be resorted to, due care being exercised not

to reduce the strength of the patient beyond the power of recuperation. He advises, in the congestive forms, external stimulation by means of rubefacients; hot baths, sinapisms, vesicants, etc., must be resorted to, with the internal use of stimulants, tonics, etc., by the stomach or bowels, and in milder cases stimulating and mercurial cathartics with general and topical bleeding to relieve congestion, when it can be done. He disapproves the use of emetics and finds the use of purgatives universally advocated.

Dr. Andrew Davidson<sup>13</sup> states that in the milder form little more will be necessary than a hot mustard foot-bath and a purgative. When the temperature is moderate, the skin moist and irritability of the stomach absent or trifling, a meddlesome line of treatment is to be avoided. As a purgative he mentions castor oil in capsules or emulsion, or ten grains of calomel with or without jalap. He insists upon the necessity for obtaining and keeping up a free action of the bowels. As an antipyretic he suggests antipyrin if the condition of the heart will permit its use. The common saline mixture containing acetate of ammonium, nitrate of potassium and spirit of nitrous ether will promote the action of the skin and kidneys and five to ten drops of the tincture of veratrum viride can be added if the arterial excitement be great. He favors the sponging of the body with cold or tepid water and the application of ice-cold cloths to the head. A few drops of chloroform or one-drop doses of creasote to relieve gastric irritability. He refers to the use by Dr. Physick and Dr. Rush of ten-drop doses of oil of turpentine in syrup; the latter used it with success even in the later stages of the disease. The use of opium he regards as dangerous, even though it allays gastric irritability. He advocates the use of milk and lime water and the swallowing of small morsels of ice. A large sinapism should always be applied over the epigastrium.

In the third stage, when vomiting is urgent and prostration extreme, moderate doses of iced champagne should be given frequently. Perchlorid of iron has been given with apparently good results in arresting the hemorrhages.

He refers to the success obtained by Sternberg's method of

treatment in which the mortality was only  $7\frac{3}{10}$  per cent. in 374 cases in the United States, Cuba and Brazil. I shall refer to this again later.

Touatre<sup>14</sup> of New Orleans gives the therapeutic treatment of yellow fever as "rest, aëration of the sick room, the administration of warm drinks in abundance and of liquid food such as milk and thin broth." He states the two principal indications of treatment as follows:

1. To strengthen and sustain the organism by fortifying the nervous system, by arresting congestion and by increasing blood pressure and diuresis. To meet this he uses cold sponging and cold bathing.

2. To consume, destroy and eliminate the toxin. This is met by aëration of the sick room and by the administration of two, three or four quarts of Celestin's Vichy water in twenty-four hours.

Our interpretation of the result of this admirable line of treatment would be that the cold sponging reduced temperature, promoted the action of the skin and perhaps toned the nervous system. It certainly induces a feeling of comfort. The Vichy water, by promoting active diuresis, ameliorates all the symptoms by rapidly eliminating the toxin that produces them. This eminent observer, who passed through nine epidemics in thirty-three years' study of the disease,<sup>15</sup> makes the following statements which are true and worthy of the greatest attention: "At the outset of the infection the patient can be succored, but what can be done when organism is poisoned, when the toxin has already affected the hepatic cells and the renal parenchyma, and when the mucous membranes are bleeding? The physician is practically disarmed, for such lesions are nearly always fatal. It is during the three first days of the disease that the physician must act. When black vomit has come to darken the situation, we can yet save some patients, but we are much better prepared to prevent the occurrence of black vomit than to cure it. The first and most indispensable thing for success in the treatment of yellow fever is that it be begun as soon as the disease has declared itself."

At the onset he always ordered a hot mustard foot-bath to relieve congestion and produce diaphoresis; a small dose of calomel, more as an intestinal antiseptic than as a purgative, and an enema consisting of a tablespoonful of sulphate of soda or magnesia in a pint of warm water every morning and night throughout the course of the disease.

He allowed no nourishment whatever during the first seventy-two hours of the fever unless the temperature fell below 102° F., in which case he ordered milk and Vichy every four hours. With the temperature above 102° F. he gave only Vichy during the three first days. This usually allays nausea and vomiting, and if it is not retained he injects it slowly into the bowel at frequent intervals. For black vomit he advises the application of an ice bag over the epigastrium.

Izett Anderson,<sup>18</sup> after thirty-four years' experience with yellow fever in the West Indies, commenced the treatment by giving from six to ten grains of calomel combined with the compound rhubarb pill or colocynth and hyoscyamus. This was followed three or four hours later by a purgative of magnesium sulphate, two drams, magnesium carbonate and potassium carbonate of each one scruple, with a tablespoonful of fresh lime juice, to be taken ice cold and while effervescing. This was repeated every third hour until the bowels had acted freely. This ingenious combination shows a wise determination to act upon the kidneys as well as the bowel. The systematic treatment after this was still diuretic and consisted of a neutral mixture composed of thirty grains of potassium bicarbonate and a dessertspoonful of freshly expressed and strained lime juice with three grains of carbolic acid. This was given every second or third hour, ice cold and while effervescing, unless the gas appeared to disturb the stomach, in which case it would be given after effervescence had subsided. High temperature in the early stage was treated by the wet pack. He states that since the adoption of this method of treatment he has never met with any cases of hyperpyrexia requiring other special treatment, nor has he encountered the profuse and uncontrollable black vomit that he had previously met with. For partial suppression of urine he used dry cups, warm

turpentine stupes, acetate and citrate of potash, but he had most faith in dram doses of spirit of nitrous ether given every hour. If there were signs of heart failure he used strychnin and alcoholic stimulants. The only food allowed throughout the attack was ice-cold milk with lime water, and in some instances albumin water. No gruels, paps or broths were permitted until the beginning of convalescence. Stimulants were never used until the second stage, and he preferred a sound, iced, Rhenish wine, which proved of the highest value.

Loomis<sup>17</sup> favored the diaphoretic and expectant plan with the use of cracked ice, milk and lime water or hypodermic injections of morphia for nausea and vomiting, cold compresses for hematemesis and the judicious use of stimulants to counteract exhaustion.

Osler<sup>18</sup> states that careful nursing and a symptomatic plan of treatment probably give the best results. He advises hydrotherapy for the fever, morphia hypodermically and ice in small quantities for the vomiting, and the hot bath for uremic symptoms. Stimulants are to be used freely during the second stage and the patient is to be carefully fed, using nutrient enemata if the stomach be irritable.

Strümpell<sup>19</sup> says that the earlier proper treatment can be instituted the better. He advocates absolute rest; evacuation of the bowel; a hot mustard foot-bath early in the attack; opium or morphia for lumbar pains, sinapisms, ice and hydrocyanic acid or chloroform for gastric irritability; cold spongings, the wet pack and cold bath for high fever.

Sternberg's treatment, referred to by Davidson<sup>20</sup> has given phenomenal results. In 374 cases treated in the United States, Cuba and Brazil, the mortality was only  $7\frac{3}{10}$  per cent. It is not to be believed that such brilliant results can ever be exceeded by any other single line of treatment. A greater percentage of lives has been saved by it than by the use of the Brand method in typhoid fever. The Brand method reduced the mortality in typhoid fever from about 14 to 7.5 per cent.;<sup>21</sup> the Sternberg treatment reduced the mortality of yellow fever from at least 20 or 25 per cent. to the same figure.

In addition to the administration of bichlorid of mercury and



sodium bicarbonate, the special treatment he advises is as follows:<sup>22</sup> A hot mustard foot-bath during the first twenty-four hours; cold sponging; cold applications to the head; protection of the patient from currents of air; sinapisms over the stomach and lumbar region when called for; the promotion of perspiration, and the withholding of food during the first three days; stimulants in the form of iced champagne or good brandy after the fourth day. If the stomach be irritable he advises milk and lime water, and if this do not agree, nutrient enemata. Later on he allows milk punch, ale, porter, etc.

Having reviewed the older as well as the more modern methods of treatment we are in a position to profit by the experiences of the numerous observers who have placed their methods and results on record.

In yellow fever we are dealing with a disease of short duration and one that tests severely the vital powers of the patient. I believe, however, that in previously healthy, non-debilitated subjects, free from organic lesions, the mortality can be reduced practically to zero by careful and judicious treatment instituted in the incipency of the attack. On the other hand, if there be present debility from any cause, anemia, organic lesions of the heart, liver or kidneys, the outlook is always serious and recovery doubtful. The treatment must be essentially eliminative and supporting, with the incidental use of measures tending to reduce hyperpyrexia, relieve pain and nausea and remove internal congestions.

Before taking up the treatment in detail it will be better to consider briefly the conspicuous pathological lesions that are present and the deductions to be drawn from them. In the first place, the lesions and symptoms are produced by a powerful toxin circulating in the blood and tissue fluids. This poison appears to act with greatest intensity upon the liver and next upon the kidneys. The changes in the liver are at first a congestion, which is followed by cloudy swelling, granular and fatty degeneration with more or less extensive cell necrosis. In cloudy swelling the organ is enlarged and firm, and a great deal of the blood is displaced by the pressure of the swollen cells upon the capillaries.

With granular and early fatty degeneration the swelling and pressure are slightly increased so that there is considerable obstruction to the flow of blood through the organ. Practically all of the blood supplied to the liver comes through the portal vein, in which the pressure is very low, and any serious obstruction to the flow of blood through that viscus will necessarily result in a damming-up of blood primarily in the portal vein, secondarily in the vessels from which it receives its supply.

Of these the duodenal and pyloric veins are the shortest and have the least communication with other vessels. On the other hand, the mesenteric veins are of greater length and are distributed over large areas. Hence the passive congestion and hemorrhages which result from obstruction to the portal circulation, when of rapid onset, are more intense and manifested earlier in pylorus and duodenum than in other portions of the small intestine. This explains the pain and tenderness on deep pressure in the epigastric region, which is so early and constant a symptom in yellow fever and which is the result, not of a specific action of the toxin upon the mucous membrane itself, but of obstruction to the portal circulation, causing a backward pressure along these short vessels—the pyloric and duodenal veins—that promptly affects the rich capillary plexus in which each of them originates. The hemorrhages which occur later result from capillary stasis, aided, possibly, by a condition of toxemia.

That this is probably the correct explanation appears from the fact that we find the same condition of the gastro-intestinal mucous membrane with hemorrhages, black vomit or bloody discharges, in other conditions than yellow fever, where the liver is seriously damaged. I refer to advanced cirrhosis, acute yellow atrophy, acute phosphorus poisoning and excessive fatty degeneration with cell necrosis; occurring with or without infection. And more than this, in these latter conditions the patient dies with the same cerebral, eclamptic or so-called uremic symptoms that we see so very frequently in this disease. And further, the autopsies and subsequent microscopic examinations develop the fact that in numerous instances the liver and not the kidney is the organ most seriously affected. This statement applies also to yellow

fever, and I believe that the supposed uremic condition in this disease is often more probably one of poisoning from the accumulation in the circulation of the organic ammonia compounds which the liver normally converts into urea, with other waste or end products, the constitution of which is not well known, though some of them are thought to be of an acid nature. These are developed as the products of proteid digestion and as the nitrogenous end products of cell metabolism throughout the body largely in the form of carbonate, lactate and perhaps carbamate of ammonium.<sup>25</sup> Where the liver loses its functioning power, therefore, there must be a deficiency in urea,<sup>26</sup> and the kidneys cease to secrete urine because urea, the normal stimulus to that function, is absent. Osler<sup>25</sup> states that there are cases in which anuria is prerenal, and among the conditions in which this occurs, he mentions fevers and inflammations, acute poisoning by phosphorus, etc.; in the collapse after severe injuries or operations, and "in the collapse stage of cholera and yellow fever."

About two years ago I performed an autopsy on a woman who died with uremic symptoms on the third day following a laparotomy. The wound was found to be perfectly healed and there were no signs of inflammation. The kidneys changes found on macroscopical and microscopical examination were comparatively insignificant while the liver showed excessive fatty degeneration with some cell necrosis and a beginning hypertrophic cirrhosis. Cultures from the abdominal cavity, blood, liver, kidney and spleen were all negative. I believe now that death was due to the inability of the previously fatty and cirrhotic liver to dispose of the products of greatly increased cell metabolism, the result of the operation. As there appeared to be a deficiency of bile, the case was supposed to be one of acholia.<sup>26</sup>

It is quite plain from our text-books that retention of urea in the blood is not always the cause of "uremic symptoms." In some cases, no doubt, where the liver and kidneys are both seriously at fault, the condition may be one of combined uremia and ammonemia or other intoxication. Urea seems to exert a toxic effect only when it is present in large amount, and patients frequently recover from pronounced attacks of uremia even in scarlet fever.<sup>27</sup>

Urea may be present in the blood in large quantity without producing symptoms,<sup>29</sup> and in uremic conditions ten to fifteen times the normal amount of urea is sometimes found in the blood. Loomis<sup>30</sup> states that after withdrawal the blood of yellow-fever patients undergoes ammoniacal decomposition, and some affirm that the blood contains free ammonia. According to Joseph Jones<sup>30</sup> of New Orleans, yellow fever blood contains abnormal amounts of urea, extractive matter and ammonia. But carbonate of ammonia is scarcely ever found in the blood of uremic patients, and the theory of the decomposition of urea into ammonia in the blood is untenable.<sup>31</sup> La Roché found the blood in yellow fever to be acid or neutral to litmus.<sup>32</sup>

The primary indication in the treatment of yellow fever is to remove the immediate cause of the condition present, viz., the toxin. This is the best and most expeditiously effected through the normal channel with the urinary secretion, aided by a moderately free action of the skin and moderate depletion of the digestive tract by the use of mild saline cathartics. With the evacuation of these fluids and the toxin they contain the symptoms abate—speaking of the early stage—and the stomach will retain an increased amount of fluid to replace that which has been removed. Care should be taken to maintain one or more of these functions throughout the attack, sustaining the patient's strength by the judicious use of the appropriate stimulants. It is much to be regretted that we have no means of acting directly upon the liver.

In the earliest stage a hot mustard foot-bath is of great service and should be used as a matter of general routine when the case is seen sufficiently early. It relieves internal congestions, lessens the headache and promotes diaphoresis. From personal experience I think more stress should be laid on the necessity for confining the hot mustard foot-baths to the earliest stage as laid down by Sternberg and nearly all writers. In my own case it was used for the first time on the third day, and I shall never forget the effect of it. Within about half an hour after the removal of the bath and while I was oppressed by the weight of a heavy load of gray blankets, I felt a sudden pain and embarrass-

ment at the heart. The pain was very acute and accompanied by a feeling of distension, as if the organ was much distended and was being arrested in diastole. Happily, it lasted but a few moments. This was the only time I felt myself to be in imminent danger. The bath was not repeated and there was no recurrence of the paroxysm.

If nausea be present a sinapism should be applied over the region of the stomach and the same application should be used for pain in the lumbar region. Cold applications afford most relief for the pain in the head. The muscular pains usually become ameliorated after a few hours, and it is best not to administer remedies for them unless they are unusually severe, in which case it would be permissible to use very small doses of antipyrin or phenacetin. It is advisable and probably necessary to give a mild cathartic at the beginning; say several one-sixth grain doses of calomel or three or four grains each of calomel, rhubarb and soda in capsules. These should be followed by several dram doses of sulphate of soda at hourly intervals until there is a free evacuation. In small doses this salt is diuretic as well as laxative, and, in my opinion, it is the least disagreeable of the saline cathartics. The nauseating effect of castor oil should forbid its use unless the patient expresses a preference for it. The routine administration of a tablespoonful of sulphate of soda in a pint of warm water as an enema, night and morning, as practiced by Touatre, seems to me an excellent plan. The patient should be encouraged to take plenty of fluid in small quantities at frequent intervals or cracked ice if there be nausea or irritability of the stomach. In this case it would be well to try also small quantities of milk and lime water, carbonated Vichy or an effervescing neutral mixture given ice cold. My preference is for carbonated Vichy *ad libitum*, and if it be not obtainable, the neutral mixture prepared with fresh lime juice as used by Anderson, but omitting the carbolic acid. This mixture should be neither acid nor alkaline, but neutral.

If sufficient fluid cannot be taken by the stomach, give very slowly high rectal injections of warm or tepid water to which may be added bicarbonate of sodium, sulphate of sodium, chlorid of

sodium, citrate of potassium or any of the simple alkaline diuretics. Bicarbonate of sodium is probably the best because it is said to exert a soothing effect upon the mucous membranes in general, and should be easily retained. As the purpose of this injection would be chiefly to secure absorption of the fluid and its effect upon the kidneys, it should not be too cold. I have seen patients complain bitterly after the use of ice-water enemata. If the temperature be high and the skin dry, cold or tepid sponge baths will give comfort and aid the action of the skin; at the same time half-dram doses of spirit of nitrous ether could be given every half hour until the skin became moist or the temperature began to decline.\* The quantity of urine passed must be carefully noted; it is often necessary to use the catheter. If the pain in the lumbar region be severe and the bladder remain empty, the patient should be placed in a warm bath to which a little mustard has been added and kept there until the skin becomes reddened. This should be used only in the first stage, to relieve congestion and determine the blood to the skin. If the temperature be moderate, the skin moist and the bowels and kidneys active, the patient should be given absolute rest in bed in a well-ventilated, slightly darkened room. He must be lightly covered and protected from draughts. The use of mosquito nets and wire screens is an important adjunct to the treatment.

All food should be withheld during the first three days with the possible exception of milk and lime water or milk and Vichy if it be well retained. Should the patient desire it, I would not hesitate to give an occasional small dose, say two or three drams, of champagne, ice-cold and diluted. Besides being a grateful stimulant, it quiets the stomach and retards tissue waste. The necessity for buoying up the heart is apparent when we consider that the passive congestion of the stomach and intestine is best relieved by strengthening the circulation until the cause can be removed by elimination. In the selection of an agent for this purpose there is room for choice. The sodium salt appears to

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\*There seems to be a hesitancy to use diuretics in this disease probably for fear of damaging the kidneys. No simple drug will do so much damage as the toxin. If this poison be freely eliminated, the subsequent course of the disease will be modified.

possess several advantages. It is the normal alkaline base of the blood plasma; it is bland, non-irritating, acceptable to the stomach, and mildly diuretic; and, according to high authority,<sup>33</sup> "it is reported to be singularly efficient in the suppression of urine from renal disease." We must not lose sight of the reported diminished alkalinity of the blood in this disease and the possibility that this may be due to the presence of an acid poison which is neutralized by the sodium salt. In the Sternberg treatment, about two and one-half drams of the bicarbonate of sodium are administered in twenty-four hours. The Vichy water treatment is practically treatment by bicarbonate of sodium.

Sulphate of sodium, the value of which was first shown by Dr. Kearsley of Philadelphia in 1741, is endorsed by Dr. Touatre of New Orleans, and Surgeon R. D. Murray of the Marine Hospital Service gives it the preference over other salines.<sup>34</sup> A good dry champagne is the best stimulant to begin with; when the patient tires of it a sound Rhenish wine should be substituted; Dr. Murray has had good results with dry Catawba.<sup>35</sup>

If there are signs of heart failure, strychnin should be used freely. If the patient is not seen until the second stage the treatment must be symptomatic. For vomiting, ice bags to the epigastrium are probably the best remedy; they can be supplemented by small doses of cocain and hypodermics of morphin according to indications, but carbonated Vichy, lime water or champagne will probably prove sufficient unless black vomit has set in or is impending. In this case turpentine has been recommended and is worth considering on account of its properties as a local and general stimulant, hemostatic and diuretic. Tincture of capsicum is also said to be a valuable local and general stimulant in this condition. The patient's strength must be sustained as far as possible, the action of the kidneys encouraged through absorption of fluid from the bowel and the blood determined to the surface by friction of the skin with mustard water. The value of the hot-air bath in cases of anuria is too well known and appreciated to require more than a mention of it. Whether the poisonous agent be urea or any other soluble substance it is equally important to secure its elimination by this or any other method.

The nutrition of the patient is a subject well worthy of consideration. Food is frequently withheld for varying periods from three to five days or a week; in my own case I think for at least eight days nothing was allowed but water, Apollinaris, ice and champagne. Now, during all this time certain cells of the body are functioning and using up their own protoplasm, for in conditions of anemia, debility or malnutrition and in the infectious diseases we know that the cells of the vital organs undergo degeneration and often necrosis from lack of nutritive material. In specific fevers the functions of some of these cells are greatly stimulated. The proteid constituents of the cells are consumed in the performance of these functions,<sup>36</sup> and converted into waste material and end-products which add to the general intoxication. Physiologists teach us that there are certain foods that will prevent this degeneration of the cells to a considerable extent by saving their proteid constituents.<sup>37</sup> Among these are gelatin and fat, non-proteid foods, the latter of which, in the form of olive oil, has been used with marked success by Spanish physicians in the treatment of yellow fever. According to La Roche, of thirty-six patients admitted to the hospital at Vera Cruz with black vomit, no less than thirty recovered after treatment by inunction with the heated oil,<sup>38</sup> and other equally remarkable results are mentioned. In another place we find that Father Constans acquired a great reputation in Spain in the early part of the nineteenth century, in the treatment of yellow fever, and his chief reliance was olive oil which he gave in large doses. The rationale of this treatment seems to be that the oil is highly nutritious, a proteid saver, and is readily absorbed by the epithelial and endothelial cells of the capillaries. In this way the integrity of the latter is preserved and hemorrhage prevented. Pathology teaches us that where there is capillary blood stasis, hemorrhage soon takes place from deprivation of nutriment, the endothelial cells of the capillaries being nourished by the blood that circulates within them. This suggests the early administration of olive oil in emulsion with lime water.

Animal foods have long been condemned, but the use of toast-water or thin barley, rice, sago or hominy water, after pro-



longed boiling and salting, are probably advantageous. Some of these are strongly advocated by Surgeon Murray<sup>39</sup> and the older observers, and one can readily believe that the starches they contain would be of service in restoring the functioning power of the hepatic cells. Murray also records eighty cases that were fed on ice cream, *ad libitum*, with only four deaths. And ice cream is rich in fat. So that if the stomach is reasonably quiet, we can safely satisfy the gnawings of hunger by the use of barley, rice or toast-water, milk and Vichy or lime water, ice cream, lemon jelly and fruit juices in addition to mild stimulation and the use of olive oil internally or externally. To withhold all nourishment throughout the course of the fever seems injudicious and unsafe. With the temperature below 102° F., and the stomach quiet I believe the patient will be greatly benefited by small quantities of such of the foods mentioned above as his taste may call for.

The early involvement of the liver as indicated by the early lesion in the duodenum naturally suggests an equally early defect in the functioning power of the liver of the elaboration of urea. This deficiency which must sooner or later become marked, is manifested in the failure of the kidneys to secrete the normal amount of urine. As the rate of elimination by these organs increases normally with an increase of the urea in the blood,<sup>40</sup> it would seem justifiable to supply the defect by the medicinal administration of urea either through the stomach or by hypodermic injection, as soon as the ordinary remedies cease to have the desired effect. The injection of urea into the blood soon evokes a very copious secretion of urine, "even if, previously to the injection, the secretion had been at a standstill."<sup>41</sup> We can hardly do better than follow Nature's method of stimulating these organs to perform their normal functions. And the danger of an excessive accumulation of urea in the blood must be very slight in a condition where that substance is manifestly deficient. The longer the kidneys are permitted to act imperfectly, the greater will be the retention of toxins which will react by increasing the damage already done to both liver and kidneys. This is not by any means a new suggestion, for urea was proposed as a diuretic

by the older French physicians and it was used by Prof. Mauthner<sup>a</sup> of Vienna. Fifty years ago Dr. T. H. Tanner<sup>a</sup> of London reported success with it in cases of dropsy. In one case he used ten grains every six hours for nine days with the effect of increasing the flow of urine from 14 to 44 ounces in twenty-four hours; during the nine days the quantity passed varied from 35 to 40 ounces. It was then discontinued because the dropsy had been removed. After three weeks it was again resorted to with the same satisfactory results.

In my opinion the services of trained female nurses are indispensable to secure the very best results. They should be under strict discipline, and the tour of duty with patients who are seriously ill should be eight hours in twenty-four.

The physician should not treat his patients by proxy, but should assure himself that his line of treatment is being faithfully carried out. All meddling medication should be prohibited.

It is well to bear in mind the possibility of the occurrence of complications through secondary infection by the streptococcus, staphylococcus, colon bacillus or bacilli of the hog cholera group, known also under the name of *B. icteroides*, *B. enteritidis*, paracolon, paratyphoid, etc.<sup>a</sup> The chances for the occurrence of such infection will probably be greatly diminished by the early institution of such treatment as will best maintain the integrity of the intestinal mucosa and conserve the patient's strength.

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## BOSTON.

THE HISTORIC CITY IN WHICH THE TWELFTH ANNUAL MEETING  
OF THE ASSOCIATION OF MILITARY SURGEONS OF  
THE UNITED STATES IS TO CONVENE.

THE evolution of a word,—Botolph's town, Bot's town, Boston,—gave us the present name of this old New England city. The dissatisfaction of certain English Puritans gave to the city its first inhabitants. The enterprise, smartness, and grit of these long ago settlers, created "modern Athens", and the passing of the years has seen cow-paths merge into streets full of traffic, green fields trodden underfoot by massive buildings, a mere handful of people multiplied by hundreds of thousands, and the old time stage-coaches replaced by whizzing, steamless, noisy things that rush along on bands of steel, stretched up high in the heavens above, deep down in the earth beneath, and along the stone-paved streets wherever is seems best, for the transportation of the thronging multitudes.

In things courageous, in deeds of daring, and paths of learning, culture, and art, Boston holds her head high.

In historic events she takes the New England lead. "No taxation without representation", was first declared by her citizens; that greatest of masquerades, the Boston Tea-party, filled the waters of Boston harbor with English tea, and the battle of Bunker Hill was fought unflinchingly by the forefathers on her soil. The pages of history honor her, and give to her—the youngest of the first New England colonies—glory, laud, and praise.

Hidden away in the heart of this busy city at the head of State street, stands a small brick building which is held in greater honor than the huge structures by which it is surrounded. It is the old State House. Captain Keene gave the land for its foundation in 1657 but a fire demolished the building in 1711 and

the edifice that now greets the sight-seeing eye, was erected in 1713. Every inch of its walls tells of by-gone deeds of courage and daring. The Stamp Act documents were burned under its roof and ancient courts were held. Washington trod its hallways and gazed from its windows to review the troops, and the righteous wrath of Boston citizens against the English nation was shown by the burning of the Lion and the Unicorn, that stood upon its walls. Through "scenes and unscenes" this building has finally passed into the hands of the Boston Society, and is held sacred to the keeping of many old-time relics that are shown to visitors free of charge. The bitter feeling of English hatred has gone and the English emblems have been replaced, but the American eagle has been added and spreads his wings in majestic glory as he proclaims to the present generation, the liberty that is an outgrowth of the Boston Massacre, that was enacted almost under its ancient balcony.

Sacred to the memory of by-gone deeds this queer old State House stands and cannot even see its beautiful successor.

The present State House is perched high above the maddening crowd, on the tip-most top of Beacon Hill. Its tower windows

watch the deep blue harbor, its great dome shines with a glint of gold on a sunny day, and glistens with a myriad lights at night. The land on which it stands was one of John Hancock's cow



pastures, and its architectural lines had their birth in Charles Bulfinch's fertile brain. The proposed modernizing of the famous Bulfinch front, not many years ago, was discouraged and fought against by many of Boston's ardent citizens who pleaded their cause well and won their day.

The corner-stone of this building was laid on July 4, 1795, and three years afterwards on January 11, the house was dedicated to the use of a free people. The building contains many things of great historic value. Portraits, battle flags, and antiquities innumerable. The first State Library of America was placed under its roof, and now numbers thousands of volumes. Its smooth green-turfed lawns are guarded by Power's statue of the great Webster, and Emma Stebbin's statue of Horace Mann, and within its walls sit the "powers that be," who enact and administer the laws of the old Bay State.

Boston saw the beginning of many great events and it is



quite fitting for her to hold within her old city the "Cradle of Liberty,"—Faneuil Hall.

This is a building whose every rafter could write a book, for they have all resounded with eager en-

treaties; courageous calls, stirring commands, and staunch unyielding declarations at every momentous crisis of the Nation's history. It has also posed as the pleasure house of the British army, being used in 1775-6 as a sort of theatre to display their theatrical productions. There are many portraits and paintings of interest hanging on its walls, and the gilded glass-eyed grasshopper that serves as a weathervane still turns with every breath of wind and never seems to long for grassy fields.

The Old South Meeting House standing on the corner of Milk and Washington streets should be an inspiration to the doing of many worthy deeds. Here the old Puritan Parsons preached of the wrath to come and the joy eternal; and beneath its roof was held the public meeting from which the "Indians" went to the Boston Tea-party. Here Benjamin Franklin was

baptised into the faith, and Judge Sewall came to see the error of his ways and how wrong was his belief in witch-craft; and here also the English Dragoons proved their lawlessness and lack of reverence, by using "ye house of God" for a riding school and for a stable for horses. At a cost of \$430,000 the Preservation Society has assured the future longevity of this historic place, and it holds many rare curios and relics, furniture and pictures, that are viewed by numberless visitors every year.

Wonderful things of the olden time are often found in sequestered and out-of-the-way places, and no one is surprised to find hidden away down in the midst of the squalor and poverty of



Salem steet, a tall spire piercing the blue which is known the length and breadth of the nation, for from its tower swung the two historic lanterns that started Paul Revere on his famous midnight ride. This tower contains a chime of bells, the first ever cast in the New World. Sacred services are still held in this ancient building.



But higher than the pointing North Church spire ascends the white shaft of Bunker Hill Monument. It stands tall and straight and immovable as the determination of the Revolutionary heroes who fought on

that historic spot. Its erection was begun by Lafayette in 1825, and Daniel Webster was the orator when its corner-stone was laid. A long climb of 295 stone steps gives one ample reward, while at its base, the bronze statue of the brave and dauntless Prescott looks down over the peaceful streets, and his firm pressed lips seem to utter the stern command, "Don't fire until you see the whites of their eyes."

The more modern Boston shows the City Hall that stands just back of King's Chapel; the beautiful Trinity Church; the new Public Library with its stately, elegant lines of the Ital-



ian Renaissance, and the famous mural decorations; the massive Boston Post Office; the Chamber of Commerce; the Museum of Fine Arts, and the Boston City Hospital with its 810 beds, its great corps of surgeons and nurses, and its magnificent buildings that can be surpassed by no other such institution

in the Old World, save the hospital at Hamburg.

Boston holds a mine of good things but her suburbs hold other vast and interesting treasure houses.

Salem boasts of Hawthorn's home, the House of the Seven Gables, the Roger Williams House, the little old Meeting House,



and the bare and ghostly Gallows Hill. It shows you also many curious relics such as the famous witch pins, and the queer old houses where the poor persecuted so-called witches dwelt.

In Cambridge, the Washington elm rustles its branches, Harvard University spreads its wealth of culture and learning broadcast; Longfellow's home beckons you to visit it and have a peep at the old clock on the stairs, and the arm-chair made dear by the memories of the "Children's Hour".

Plymouth calls to you to see her famous "Rock", and the old time burying ground, and the low-roofed houses that could tell such wonderful tales of the Puritan forefathers, could they but speak.

Concord will greet you and show to you Hawthorne's Wayside, the old Manse, and the bridge where the silent Minute Man still keeps guard; and you may tip-toe into Sleepy-Hollow and see the graves of New England's greatest literary sons—Emerson, Hawthorn, and Thoreau; and the last resting-place of a dearly loved daughter—Louisa Alcott—who wrote in the midst of trials, yet gave to the world books that were sweet and good and pure.

Narrow and crooked are Boston's streets, curved are her by-paths; but broad and big and great is she in the heart of the nation; staunch, loyal and true.

## Reprints and Translations.

### THE MILITARY MEDICAL JOURNALS OF SPAIN FOR 1902.

BY LIEUTENANT CHARLES NORTON BARNEY,

MEDICAL DEPARTMENT, UNITED STATES ARMY.

TWO military medical journals are published in Spain, the *Revista de Sanidad Militar* and *La Medicina Militar Española*.

#### REVISTA DE SANIDAD MILITAR.

The *Revista de Sanidad Militar* is a semi-monthly octavo ( $9\frac{1}{4} \times 6\frac{1}{2}$  in.), of twenty pages, printed at the press of the Military Administration in Madrid, and edited by M. Gómez Flório. This name appears in the Rank List of the Sanitary Corps of the Spanish Army for January 1903 at the foot of the list of Sub-Inspectors of the 1st Class, a grade nearly corresponding to that of Lieutenant Colonel and Deputy Surgeon General in our Army.

Of the 448 pages which constitute Volume XVI, made up of the 24 semi-monthly numbers issued in 1902, 97 pages (20%) are devoted to circular orders to the Army, on such subjects as leaves of absence, uniform, and personal records; 55 pages (11%) are devoted to miscellaneous notes on such subjects as promotions, vacancies, deaths, mortality statistics of Madrid, distributions of prizes, and even notices of the latest collection of short stories; 219 pages (about 45%) are occupied by 217 abstracts and synopses of articles read at medical meetings or published in the medical press, on subjects not related to military medicine,—for example, "Cancer," "Anomalies of the Cerebral Circulation in the Insane," "Intermittent Claudication," "Artificial Feeding of the New-

born," and "Tumors of the Corpora Quadrigemina." Only 19 pages (less than 4%) are devoted to the 13 abstracts on subjects bearing on military medicine; 28 pages (about 6%) are devoted to 3 original articles on non-military subjects, viz., "Review of Recent Work on Tuberculosis," "A Case of Severe Typhoid Fever," and "Life of Pasteur;" and out of the whole 488 pages only 65 (13%) are devoted to the 6 original articles on medico-military subjects, viz., "Automobiles in the Army," "Disregarded Causes of Mortality in the Army," "Post-Hemorrhagic Syncope and Anemia, and their Treatment on the Battle Field," "Roentgen's Discovery and its Utility in the Sanitary Service," "Interesting Test Concerning the Food of the Soldier," and "Clinical Report of the Wounded in the Explosion of the Carabanchel Powder Magazine." This last article occupies nearly half of the few pages which are devoted to original articles on medico-military subjects.

With each semi-monthly number is issued 8 pages of a monograph, in the form of a "feuilleton." From January 1st to October 1st the subject of this "feuilleton" was "A Study of the Fractures Produced by Small Arm Projectiles." Since October 15th the subject has been "Bacteriology in Relation to Hygiene."

Following are abstracts of the original articles on military subjects:

**AUTOMOBILES IN THE ARMY.** (*Unsigned.*)—This article merely indicates the extent to which experiments in the use of automobiles have been carried in various armies of Europe.

**DISREGARDED CAUSES OF MORTALITY IN THE ARMY.** (*F. G. Deleito.*)—The Spanish Army has the highest mortality rate of all the armies of Europe. Though the attempts so far made to reduce this rate have been inadequate, yet the government has been and is devoting some attention to the improvement of quarters and rations, defects in which have seemed the most prominent causes of the excessive mortality. But there are important causes which have not received attention; and most important of these is the possibility of securing exemption from military service by the payment of 750 pesetas.

The author declares that conditions in the Spanish Army have been such that nearly all who can scrape together sufficient money to purchase exemption from service do so, and that as a rule only those enter the ranks who, through lack of the money necessary for the purchase of exemption, have to choose between service and desertion. This means that the army is recruited from those who live under the most unhygienic conditions, for not being able to scrape together 750 pesetas implies poor food, worse lodging, and hard work.

The theory that men brought up in the country are more robust and resistant than city bred men has been discarded, and it is recognized that the peasants, who live poorly, not only are weaker than those city bred men who eat and live well, but especially in point of resistance to infections, are weaker than those city bred men who have to live unhygienically. It is the very poorest peasant class from which come the majority of recruits for the Spanish army, and there does not exist in them that robustness which the uninstructed laity think they see in a physical development attained through excessive muscular labor continued from early childhood.

When these peasants are removed from their rural environment and crowded into barracks they take every infection there is going, and encounter in an exaggerated form all those dangers of city life to which they are so unused. Thus the system of purchasing exemption from military service deprives the army of a proportion of young men brought up in cities, who are much superior to those who come from the rural districts, exempting from service those who are best able to endure life in barracks.

Another cause of mortality to which attention has not been paid is the reduction in the size of companies. Crowding has not been lessened, for two companies are now crowded into the space formerly occupied by one; half the barracks is left unoccupied while the other half is jammed full. Meantime the number of "nights in," between guard tours, is of course increased, and lack of sleep leads to intemperance.

POST-HEMORRHAGIC SYNCOPE AND ANEMIA; THEIR TREATMENT ON THE BATTLE FIELD. (*J. García Julian*).—The frequency of hemorrhage as a complication of wounds received in battle has been variously estimated at from 1% to 30%. The reason for this discrepancy is that some of the statistics consider only the wounded, and not those cases in which death takes place at once from primary hemorrhage. Very many die, however, from primary hemorrhage before they can be reached by a surgeon, and, as a rule, only those cases of hemorrhage can receive treatment by the surgeon in which there has been some delay in the effusion of blood through syncope or through the application of emergency treatment by the soldier himself or by his comrades. Thus the surgeon intervenes in the intermediate hemorrhages and of course in the secondary hemorrhages, rather than in the primary. The "Medical & Surgical History of the War of the Rebellion" attributes 67.8% of the deaths on the field of battle to hemorrhage. The percentage has been very high in combats with side arms, notably in the charge at Gravelotte (1870), where an enormous proportion of the combatants, including the commanding general himself (Legrand), died on the field from hemorrhage. The fear that the percentage of deaths from hemorrhage in modern warfare, with the use of the jacketed bullet travelling at high velocity, would be greater than with the old leaden ball, which might be expected to tear rather than smoothly cut the arterial walls, has not been confirmed by the statistics of the Spanish-American War.

At any rate abundant hemorrhages are the cause of a great number of deaths on the battle field; but in other cases the loss of blood brings with it syncope, and this, in turn, results in transitory hemostasis, a temporary let-up in the bleeding, which gives time for the transportation of the patient to the first aid station. To this point are carried many wounded in whom the pallid faces covered with sweat, the coldness of the extremities, the panting respiration interrupted by deep sighs, the irregularity of the heart beat, the faintness, the weakness and rapidity of the pulse, give little hope of life.

This post-hemorrhagic syncope and the grave picture we have drawn, which may be seen also in the field hospitals in such wounded as have received first aid and in whom the temporary tourniquets applied on the field of battle have become loosened in transportation, is produced solely by the diminution of the amount of blood in the body, through which the heart loses those hydraulic conditions necessary to its normal working. The resulting acute cerebral anemia in its turn produces important modifications in the circulation and respiration.

Although stimulants such as ammonia and ether, administered subcutaneously, succeed in whipping the heart to action, yet the relief they give is transitory, and, when the hemorrhage has been abundant, is insufficient to allow the wounded to undergo the added fatigue of transportation to hospital (sometimes not very near), and to prevent a return of syncope. The acute and profound anemia which produces the syncope must be treated.

The first means which comes to mind in this connection is "auto-transfusion," which is brought into play by strongly compressing the extremities by means of elastic bandages, so that the blood is forced from the extremities into the trunk and serves to supply the brain and other important vital organs which could not withstand any prolonged lack of blood.

But the radical remedy for this syncope and anemia is that which, by augmenting the volume of the blood, places the heart under conditions most similar to those necessary for its normal action. This result is accomplished by the intravenous injection of salt solution.

The proportion of salt needed to make the solution most nearly approximate the blood in specific gravity has been variously estimated at from 6 to 10 parts to 1000 of water. But the practical points are that cooking salt is always at hand, that water can not only be readily sterilized by boiling, but, by regulation is required always to be kept ready for use in the field hospitals and at the first aid stations, and that the

difference between the various estimations of the proper percentage of salt is another advantage in the field, where there are no means of exactly measuring doses. A heaping teaspoonful of common salt to the quart of water makes a very satisfactory solution.

In the severer cases it is important that the injection be given intravenously, in order that it may produce its effects as rapidly as possible. The operation does not take much time, and once begun may be left to an intelligent assistant.

Subcutaneous, and even rectal injections, may be used when the case is not urgent, or when the conditions as to asepsis, material, etc., are not favorable for intra-venous injection. Frequently the treatment of a post-hemorrhagic anemia, begun with intra-venous injections, has to be carried on or completed by subcutaneous injections of the same solution.

Although in some cases the loss of blood has been such that death is inevitable, yet in practice we can never know when the wounded man is certainly doomed, for even in cases which appear most desperate the injection of salt solution will often change the picture.

ROENTGEN'S DISCOVERY AND ITS UTILITY IN THE SANITARY SERVICE IN PEACE AND WAR.—*I. García Julián* enumerates the applications of the X ray to diagnosis and treatment; calls attention to the radiographic installations of the American Army in the Spanish-American war and of various armies in the South African and Chinese campaigns; and urges that the principal Spanish military hospitals, especially those which are likely to be used as base and general hospitals in time of war, be supplied with X ray apparatus. He mentions the utility of radiosopic and radiographic examinations as a means of diagnosis in the following conditions: pulmonary tuberculosis, pleurisy, hypertrophy of the heart, atheroma and aneurism (especially in the earlier stages), dilatation of the stomach (Destoff's method), pigmentation of the skin in diseases of the liver and pancreas (Jeansalme), alterations in the dimensions or location of the kidneys, biliary, ureteral, urethral and vesical calculi, chronic rheumatism, gout, arthritis

deformans, periostitis, osteomyelitis, tumors of bone, fractures dislocations and gunshot wounds. The use of X rays in treatment is mentioned in connection with lupus, sycosis, favus, tinea, and psoriasis. The paragraphs of most interest to us are those which concern the early diagnosis of tuberculosis.

Tuberculosis is of special importance in the Spanish army, where it not only has been causing 3.7% of the deaths, but, in addition has caused the discharge of even a greater number of men, who have gone to their homes in an advanced stage and there have scattered about them the germs of their disease as they had scattered them before in barracks. Some improvement, as far as the army is concerned, is to be expected as a result of recent orders, which require that cases of tuberculosis shall be discharged as soon as the diagnosis has been made; and, apart from changes in recruiting requirements, the most important improvements needed are improvements in the early diagnosis of the disease. Kelchs, Boinon, Vaillard, and Laveran have demonstrated that a great number of recruits are accepted who, though they appear to be in perfect health, are really suffering from latent tuberculosis. Alterations in nutrition, tachycardia, scapulo-humeral amyotrophy, Thompson's gingival sigh, tenderness in the upper intercostal spaces, and attempts to determine numerically the resisting power of individuals are valueless, taken alone, except as indications which make one suspect the existence of tuberculosis. Tuberculin injections for early diagnosis have been discarded in the German and French armies. Attempts to elaborate a serum reaction have given no results. Nothing enables us to diagnose tuberculosis before the appearance of bacilli in the sputum, (which all recognize as a late phenomenon), except the use of the X ray. These give data of unquestionable value, which are: diminution of the transparency of the pulmonary apices, and limitation, on the affected side, of the descent of the diaphragm on deep inspiration. These two phenomena have enabled Claude, Bécclère, Kelchs and Boinon to predict the appearance of bacilli in the sputum in many cases in which the classical methods of physical examination had given no indications.



# Medico-Military Index.

## MEDICO-MILITARY ADMINISTRATION.

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# The Twelfth Annual Meeting.

Boston, Mass., May 19, 20 and 21, 1903.

## PRELIMINARY ANNOUNCEMENT OF THE TWELFTH ANNUAL MEETING.

**T**HE Twelfth Annual Meeting of the Association of Military Surgeons of the United States will convene in Boston, Mass., on Tuesday morning, May 19, 1903, and continue in session during the two following days. Every member is cordially urged to be present and participate in all the exercises, both social and literary.

The following is a consolidation of the arrangements made for the meeting by the Committee of Arrangements, the Literary Committee, and the Committee on Transportation.

## Program of the Twelfth Annual Meeting of the Association of Military Surgeons of the United States.

*TUESDAY, MAY 19, 1903.*

10.30 O'CLOCK A. M.

### OPENING EXERCISES, FANEUIL HALL.

Selection,	- - - - -	<i>Orchestra</i>
Invocation,	<i>Rt. Rev. William Lawrence,</i>	<i>Bishop of Massachusetts.</i>
Address,	- - - <i>Hon. John L. Bates,</i>	<i>Governor of Massachusetts.</i>
Address,	- - - <i>Hon. P. A. Collins,</i>	<i>Mayor of Boston.</i>
Address,	- - - <i>Dr. George A. Francis,</i>	<i>President of the Massachusetts Medical Society.</i>
President's Annual Address,	<i>Brigadier General Robert Allen Blood,</i>	<i>President of the Association.</i>

2 O'CLOCK P. M.

## BUSINESS MEETING AT THE MEDICAL LIBRARY BUILDING.

1. Report of the Executive Committee.
2. Report of the Secretary and Editor.
3. Report of the Treasurer.
4. Report of the Literary Committee.
5. Report of the Necrology Committee.
6. Report of the Transportation Committee.
7. Report of the Incorporation Committee.
8. Report of the Public Service Medical School Committee.
9. Report of the Enno Sander Prize Medal Board of Award.
10. The Differential Diagnosis of Typhoid Fever in its earliest stages.  
*By the Successful Competitor for the Enno Sander Prize for 1903.*

8 O'CLOCK P. M.

Reception for members, ladies, and invited guests, at the Armory of the First Corps Cadets M. V. M., Columbus Ave.

WEDNESDAY. MAY 20, 1903.

10 O'CLOCK A. M.

## BUSINESS MEETING AT THE MEDICAL LIBRARY BUILDING.

1. The Education of the Medical Officer. *By Major William C. Borden, U.S. Army.*
2. The Degree of Doctor of Public Health. *By Medical Director P. Fitzsimons, U.S. Navy.*
3. The United States Army General Hospital at the Presidio of San Francisco, California, 1901-1902. *By Colonel Alfred C. Girard, U.S. Army.*
4. Some Problems for Solution by the Medical Department of the Army. *By Lieutenant Colonel John Van Rensselaer Hoff, U.S. Army.*
5. My First Aid to the Wounded; the trip of the Steamer S. R. Spaulding, transporting our Wounded Prisoners from City Point, Va., to Philadelphia after the Seven Days Battles in 1862. *By Lieutenant Colonel Henry O. Marcy, U.S.V.*
6. The Examination of Recruits for the National Guard. *By Colonel William J. Maybury, Me.V.M.*
7. The Sanitary Condition of the Town of Surigao, Mindanao, Philippine Islands. *By Captain Henry du R. Phelan, U.S.V.* Submitted by Permission of the Surgeon General of the Army.

8. The Surgeon Generals of the Army from the Revolution to the Close of the Hostilities in the Philippines; Illustrated by a Complete Series of Portraits. By *Major James Evelyn Pilcher*, U.S.V.

9. New England Men in the Medical Corps of the Navy of the United States. By *Medical Inspector Franklin Bache Stephenson*, U.S. Navy.

10. Service Conditions, Retirement and Pensions. By *Medical Director John C. Wise*, U.S. Navy.

11. Appointment of Nominating Committee.

1 O'CLOCK P. M.

On invitation of Dr. Henry O. Marcy, late Medical Director U.S.V., the Association will lunch with him at his residence, 180 Commonwealth Ave.

2.30 O'CLOCK P. M.

#### BUSINESS MEETING AT THE MEDICAL LIBRARY BUILDING.

1. Paper by *Major Axel Ames*, U.S.V.

2. On the Prevention of the Spread of Infectious Diseases on Board Ship. By *Surgeon Henry G. Beyer*, U.S. Navy.

3. Epidemic Catarrh on Ship Board. By *Passed Assistant Surgeon Dudley N. Carpenter*, U.S. Navy.

4. The Public Health and Marine Hospital Sanatorium at Fort Stanton, N.M. By *Surgeon Paul M. Carrington*, P.H. & M.H.S.

5. Remarks on the History, Cause, and Mode of Transmission of Yellow Fever, and the Occurrence of Similar Types of Fatal Fevers in Places where Yellow Fever is not Known to have Existed. By *Lieutenant James Carroll*, U.S. Army.

6. The Pathology of Latent Malarial Infection as Observed at Autopsy. By *Lieutenant Charles F. Craig*, U.S. Army.

7. Practical Methods for Purification of Drinking Water in the Field. By *Lieutenant Colonel William H. Devine*, M.V.M.

8. Leprosy as seen in the Philippines. By *Major Charles B. Ewing*, U.S. Army.

9. An Epidemic of Diphtheria on Board the United States Training Ship Buffalo. By *Medical Inspector G. E. H. Harmon*, U.S. Navy.

10. Report of a Case of Malarial Sciatica. By *Surgeon Elon O. Huntington*, U.S. Navy.

11. Notes from the Experiences of a Medical Officer in the Tropics. By *Major Charles F. Mason*, U.S. Army.

8 O'CLOCK P. M.

The Association is invited by Col. James B. Frye, Commanding First Regiment M.V.M.H.A. to a drill and evening parade by that regiment at the South Armory, Irvington St. There will also be an exhibition by the Ambulance Corps M.V.M. Capt. Robert E. Bell Commanding.

THURSDAY, APRIL 21, 1903.

10 O'CLOCK A. M.

## BUSINESS MEETING AT THE MEDICAL LIBRARY BUILDING.

1. Circumcision and Flagellation among the Filipinos. By *Lieutenant Charles Norton Barney*, U.S. Army.
2. Paper. By *Surgeon W. C. Braisted*, U.S. Navy.
3. Paper. By *Captain James Brew*, Tenn. N. G.
4. Paper. By *Surgeon S. G. Evans*, U.S. Navy.
5. An External Suture. By *Captain Thomas Page Grant*, K.S.G.
6. Gunshot Wounds of the Abdomen. By *Major Wallace Neff*, U.S.V.
7. Dislocation of the First Metatarsal Bone. By *Surgeon Henry W. Sawtelle*, P.H. & M.H.S.
8. The Treatment of Abdominal Injuries with Special Reference to Gunshot Wounds of the Liver. By *Colonel John E. Summers, Jr.*, Nebraska.
9. Sick Bay Notes. By *Surgeon C. F. Stokes*, U.S. Navy.
10. A Case of Intradural Hemorrhage without Fracture, caused by a Football Injury; Operation followed by Recovery. By *Surgeon F. W. F. Wieber*, U.S. Navy.
11. Paper. By *Assistant Surgeon General George Tully Vaughan*, P.H. & M.H.S.
12. Report of Nominating Committee.
13. Election of Officers.

2 O'CLOCK P. M.

Excursion to Lexington, and Concord by Automobiles, through the courtesy of members of the Automobile Club of Mass.

FRIDAY, MAY 22, 1903.

The committee have arranged several excursions for this day among them one to Fort Warren and Boston Harbor at 8.30

o'clock A.M. A trip to Plymouth and Duxbury. One to visit Old Boston and Bunker Hill and the Navy Yard, together with several to be announced later.

*The Committee of Arrangements wish to call the attention of the members to the card-board insertion in this number of the JOURNAL and in addition to the information given there to state that the railroads will allow the usual concession of one fare and a third, as announced by the committee on transportation.*

### **Special Arrangements for Ladies Accompanying Members.**

A special Committee of ladies with Mrs. Lulu V. Upham as chairman will entertain the visiting ladies during the meeting, and have arranged for them the following program:

#### *TUESDAY P. M., MAY 19, 1903.*

The members for the ladies committee will hold themselves in readiness to attend the visitors to such places of interest as they may wish to visit singly or in parties.

#### *WEDNESDAY, MAY 20, 1903.*

A private lunch will be given to visiting guests by Mrs. Samuel Elliot, Regent of Warren Prescott Chapter, D.A.R., in her historic old home at 44 Brimmer St., to meet Mrs. Julia Ward Howe, Mrs. Mary A. Livermore and other noted Massachusetts women.

At 4 P. M. the New England Women's Press Association, Mrs. Emeline Ricker President, will tender the ladies a reception, inviting in their honor the army and navy contingent and Boston's literati.

#### *THURSDAY MAY 21, 1903.*

A committee of Cambridge ladies, Mrs. Estelle Hatch Merrill ex-president of Cantabrigia, Chairman, will show the visitors the sights of Cambridge, including the home of Longfellow to which his daughter Miss Alice Longfellow cordially invites them. A private lunch will be served.

### Reduced Railroad Fares.

Reduced railroad rates may be obtained by persons coming to this meeting at the rate of one fare and a third for the round trip. To assure the rate, each person must purchase, not earlier than three days before the meeting, one first-class ticket to Boston, Mass., and obtain agent a certificate *certificate is absolute* the reduced rate of lar return fare will upon the presentate, properly enagent in Boston. certificate should the Committee] of mediately upon ar-



Badge of the Boston Meeting.

from the ticket to that effect. *The lutely essential*, as one-third the regular be allowed only tion of the certified, to the ticket The return fare be deposited with Arrangements imrival in Boston.



## RELATION OF VOLUNTEER RELIEF ASSOCIATIONS TO THE GOVERNMENT.

By MAJOR GEORGE G. GROFF,  
LEWISBURGH, PENNSYLVANIA.

BRIGADE SURGEON OF UNITED STATES VOLUNTEERS; LATE COM-  
MISSIONER OF THE NATIONAL RELIEF COMMISSION IN  
PORTO RICO.

### THE NEED OF VOLUNTEER RELIEF ASSOCIATIONS.

**I**N all emergencies of a national character, volunteer relief is essential to supplement the efforts of the General Government. This is especially true in wars, which generally arise suddenly, and are accompanied by such appalling disasters, that the aid of the whole nation is often needed to reduce suffering to a minimum.

It will always be true that raw levies of troops, and troops in active campaigns, will suffer much more sickness, than troops in barracks. During the first year of our Civil War, 104.4 men in each thousand in the Northern army were constantly in the hospitals. During the first three years of the same war, 1,250,000 men from the Northern armies passed through the hospitals. After the battles of the Wilderness, 10,000 sick and wounded soldiers were transported North by the Christian Commission. After the battle of Gettysburg, the U. S. Sanitary Commission expended some \$75,000.00 on the relief of the sick and wounded on that field, and the Christian Commission about \$50,000.00. During our Civil War, it is estimated that the Sanitary and Christian Commissions, jointly expended \$24,000,000.00 in assisting the General Government to care for disabled soldiers. In the Crimea, in the British army, the loss rose from 293 per M per annum in July 1854 to 1174 per M per annum in Jan. 1855, and for the first three months of 1855, it amounted to 912 per M per

annum, of which 98% was from disease. This is an indication that the government was unable to meet all the demands made upon it of a sanitary nature.

#### THE EXPERIENCE FROM OUR CIVIL WAR.

From the experience gained in this war, it is manifest that in any great struggle, volunteer relief is needed in several directions.

1. On Battle Fields, and in Camps to supplement the ordinary work of the government.
2. In transportation of sick and wounded to the rear and to their homes.
3. Special Relief.
4. Home Relief.

On great battlefields, like those of Gettysburg, Antietam, before Richmond, and many others, the number of wounded and disabled was so immense that it was impossible for the army surgeons and the hospital corps to attend to all the demands made upon them. Here voluntary relief societies must furnish surgeons, nurses, minute men, and hospital supplies. Circular 42 of the Sanitary Commission indicates the need of voluntary relief. "An examination showed that the condition of the wounded men was deplorable. Some were just as they had been left by the fortunes of war, *four days before*; their wounds as yet, undressed, smeared with filth and blood, and all their wants unsupplied. Others had had their wounds dressed, one, two, or three days before: others still were under the overburdened surgeons' charge, without an article of clothing to give any one a change, without an extra blanket, with few medicines, no stimulants, and nothing but corn-meal gruel, hard bread, and bacon, to dispense as food."

The *Ordinary Work* of the relief societies is to gather supplies and men and to have them where they can aid the government when most needed in just such cases as the above. To transport the wounded and disabled, special trains, hospital ships, and in some cases wagon trains, wholly under charge of the surgeons of the relief societies, may be needed, as in such cases where the wounded and sick are necessarily abandoned by their own surgeons. *Special Relief* was an exceedingly important part of the work of the Christian and Sanitary Commissions. The work

was in the direction of sustaining soldiers' "Lodges," "Rests," "Asylums," "Refuges," and "Homes" where soldiers sick, convalescent, and detached from their commands, received temporary relief. At points where large numbers of troops passed, "soldiers' restaurants" were established, where troops enroute to the front, or to their homes, were always provided with a substantial meal. The sick and wounded were also fed enroute on the hospital or other trains, and financially stranded soldiers were furnished with "meal tickets" which were recognized at leading restaurants all over the country.

Couriers were placed on trains where many sick traveled, to assist them in securing transportation, and against sharpers; and a *claim department* maintained in all the larger cities of the country, aided soldiers in securing pay, bounties, pensions, and in completing and clearing their records: a literary bureau to prepare hygienic and other circulars was also needed and found to be very useful.

This special relief work is treated of in circular 59<sup>th</sup> Vol. I; circular 77 Vol. II; and circular 69<sup>th</sup> Vol. II of the documents of the Sanitary Commission, New York 1866. The value of this special relief work is beyond estimation. *Home relief* is needed for the dependent families of soldiers and for discharged soldiers themselves, to secure work for such families, for discharged soldiers and to get disabled soldiers into permanent homes. Here may also be noted the securing of accommodation for sick and wounded soldiers in local hospitals. With the great recent increase of these hospitals, and the perfection of transportation, this aid can in the future be made of greater use than ever before. *All volunteer aid societies should furnish their own transportation.*

#### RECOGNITION OF VOLUNTEER RELIEF SOCIETIES BY THE GENERAL GOVERNMENT.

During our Civil War, the U. S. Sanitary Commission was by military order given an official standing. The Christian Commission was also recognized by the Government since that time, the National Red Cross Society has secured an international recognition. The generosity and humanity of our people, in any

war, will cause them at once to organize countless Patriotic and Soldiers' Relief Societies. The people of each City, State, Town, County, and Township will speedily organize one or more societies to look after their own soldiers.

To say nothing of the waste of energy and of money, if these societies should try to operate independently in distribution of supplies, as they will certainly try to do, it is manifestly impossible for the Government to recognize one hundred and fifty, or twenty-five, or even ten volunteer relief societies. They must in some manner unite their forces and efforts. Many home societies may gather material for relief, but a few societies only can be recognized in dispensing it.

#### SOCIETIES RECOMMENDED FOR RECOGNITION.

From the experience gained in former wars, it is certain that our people will not be willing to confine their gifts to any one volunteer society. That relief may be gathered from every source, and that all givers may be satisfied with the recipients who are to dispense their bounty, the Government will need recognize more societies than one.

It is suggested because the people well remember their magnificent records, that the Government recognize in future wars, as its auxiliaries, the *Christian Commission*, the National Red Cross Society, and the U. S. Sanitary Commission.

The Christian Commission to labor with the Chaplains, in all moral and religious work; to have exclusive charge of the distribution of general reading matter, Bibles, stationery, amusements, housewives, tobacco, the maintenance of reading rooms, and the visitation for consolation of the sick and wounded. This Commission should furnish its own transportation. It is suggested that the Army and Navy Branch of the Young Men's Christian Association, being now in the field, develop this work for future emergencies. The agents of this Commission should serve permanently where possible, should reach *all troops* by traveling agents, especially those isolated. No special Government supervision of this work is needed, except a general order requiring the agents of the Christian Commission to work with the army

Chaplains, and after great battles, they may be called upon to aid the wounded. The agents of this commission should dress as civilians, but wear the badge of the Chaplains, (or that of the National Red Cross, if this can be agreed upon.)

It is suggested that the National Red Cross Society be the recognized auxillary of the Government in the ordinary work of caring for the sick and wounded on the battle fields, and in the camps at the seat of war, as well as the transportation of wounded from the front, and that all the special forms of relief be assigned to the U. S. Sanitary Commission.

#### WORK ASSIGNED THE U. S. SANITARY COMMISSION.

This special work includes:

(a) The sanitary inspection of all *volunteer troops* at frequent intervals, under the same rules that governed the Sanitary Commission in the Civil War, with power to report to the Surgeon General and the Honorable Secretary of War.

(b) The maintenance of a soldiers' "Claim Agency."

(c) The maintenance of Soldiers' "lodges," "rests," restaurants," etc., at all points where needed.

(d) The transportation of sick and wounded from general and division hospitals to points remote from the seat of war.

(e) The maintenance of a "literary bureau" for the issuing of sanitary and other leaflets.

(f) A hospital directory of all sick and wounded soldiers.

(g) A Bureau of emergency to maintain lists of nurses, cooks, minute men, surgeons, physicians, dressers and all other persons who would be of temporary use to the Government and who had volunteered to serve when called upon.

All relief material received by anyone of the societies recognized by the Government, shall be turned over to that recognized society which is especially charged with the distribution of the same.

#### RELATIONS OF MEMBERS OF VOLUNTEER AID SOCIETIES TO THE LOCAL MILITARY AUTHORITIES.

*(Adapted from the British Army Regulations.)*

1. The *personnel* and *matériel* supplied by societies desirous of rendering supplemented aid to sick and wounded in the field,

will be placed at the disposal of the Chief Medical Officer of the Field Force; and in all matters connected with the care and welfare of the sick and wounded, the Commissioners and Delegates of such societies will cooperate with him and be under his directions.

2. Only under very exceptional circumstances will societies which have not come into association with the National Red Cross Society be permitted to supplement the medical service in the field.

3. Supplies of all kinds forwarded under the auspices of the National Red Cross Society, the U. S. Sanitary Commission, the Christian Commission, or any local aid society, will be distributed to such hospitals as the Chief Surgeon may direct; but such supplies will not be introduced into a hospital, or issued to patients, except with the permission of the Chief Medical Officer of the hospital.

4. The Chief Medical Officer of a Field Force may give orders that no civilians be allowed to visit any hospital, unless duly provided with a pass signed by him or the Officer in charge thereof.

5. All members of Voluntary Aid Societies will, on arrival at, or departure from the base of operations, report themselves to the Officer in charge of the General Hospital at the base.

#### ORGANIZATION OF THE U. S. SANITARY COMMISSION.

It is recommended that:

1. The President of the United States immediately appoint, for each State, Territory, Dependency, and for the District of Columbia, a Commissioner and shall invite the Governor of each State, Territory and Dependency to appoint a second Commissioner.

2. These Commissioners shall meet in the City of Washington on a date named by the President of the United States, and shall elect a President, a General Secretary, a Field Secretary, a Treasurer and an Executive Committee.

3. The President shall direct the Secretary of War to issue an order similar to the order of 1861, by which the Sanitary Commission was recognized as an auxiliary of the Government.

4. The U. S. Sanitary Commission shall recommend the formation of State, county, city, and township Relief Societies throughout the United States.

5. The Sanitary Commission shall cooperate with the National Red Cross Society and with the local relief societies, in the collection, storage, and distribution of all material which may be needed to supplement the work of the Government in the care of its sick and wounded soldiers.

6. In case of foreign wars, it may equip hospital ships, hospital trains, and other means of transportation of which the sick and wounded may be most speedily returned to the United States.

The badge of the U. S. Sanitary Commission shall be a silver cross worn on a blue field on the right arm.

(On Organization of Sanitary Commission: See Cir. 86 and 92, Vol. II. U.S. Sanitary Documents.)

#### THE LITERARY BUREAU OF THE U. S. SANITARY COMMISSION.

It is believed that army regulations are not grasped readily by volunteer officers, who are hastily gathered from civil life. In the Civil War, the Sanitary Commission made great use of *Circulars*, *Bulletins*, and *Letters*. In order that at a future time of need, the material then found valuable may be accessible, it is recommended that the following circulars and leaflets be issued to all volunteer officers and to other persons as indicated. These should all be issued *in uniform size*, on good but thin paper.

1. To All Volunteer Officers:

Rules for preserving the health of soldiers. (See letter C Medical and Surgical Monographs in report U.S. Sanitary Commission.)

2. To All Volunteer Officers:

Personal Hygiene for Army Officers.

3. To All Volunteer Officers:

What the Quartermaster's Department Furnishes and does not Furnish. How to draw supplies from the Quartermaster.

4. To All Volunteer Officers:

What the Commissary Department Furnishes and What it does not Furnish. How to draw Supplies from the Commissary.

5. To All Volunteer Medical Officers:

What the Medical Department Furnishes and What it does not Furnish. How to draw Supplies from the Medical Department.

6. To All Volunteer Medical Officers:

Directions to Army Surgeons, as to what is expected in maintaining efficient Sanitary conditions in Camps.

7. To All Volunteer Medical Officers:

Directions to Army Surgeons on the Field of Battle. (See letter B, Medical and Surgical Monographs of U.S. Sanitary Commission.)

8. To All Volunteer Medical Officers:

The, Regimental, Division, and General Hospitals. The Equipment, Officers, and Functions of each.

9. To All Volunteer Company Officers:

The duties of Company Commanders. (Sanitary Duties especially elaborated.)

10. To All Volunteer Company Officers:

The Company Fund. How to Commence, Sustain, and Administer it.

11. To All Nurses:

A Nurse's First Duty. (See circular on same published by U.S. Sanitary Commission.)

12. To All Soldiers:

Personal Hygiene for Soldiers. How the Soldier Should try to Live to Maintain good Health.

13. Song Books:

Patriotic and Religious Songs.

14. Guide Books for Foreign Countries:

Should contain a *map* and a few simple conversational phrases, and a short vocabulary of commonest words.

15. Leaflet on the Organization of City and County and Societies  
(for use of State Sanitary Commissions, Local Aid Societies,  
etc.)

The articles of food needed by the sick soldier.

The articles of medicine needed by the sick soldier.

How to make "housewives."

Tobacco, games, literature, etc., to be gathered, manner of safely packing, forwarding, etc.

It is urged that this Association of Military Surgeons proceed to devise by means of legislation or otherwise, to secure the immediate organization of a permanent United States Sanitary Commission on the lines above suggested in order that the machinery may be in existence whenever there may be need for it.



AMBULANCE AND TRANSPORT VEHICLES OF THE  
TENTH FIELD HOSPITAL OF THE CANADIAN  
ARMY MEDICAL SERVICES.\*

BY COLONEL J. L. HUBERT NEILSON,

DIRECTOR GENERAL OF THE MEDICAL SERVICES OF CANADA.

I MUST TELL YOU that I did not expect in the least to be called upon to address you on any subject whatever, except to thank you all most cordially for the fraternal manner in which you have received me as a foreign visitor, a delegate from Canada. This reception has touched me very deeply and I am very grateful personally; and I shall take home to the officers of my own service a most gratifying statement of what I have seen and heard during my stay amongst you.

The Chairman calls upon me to address you touching a transport and ambulance wagon which I designed last autumn for the 10th field hospital of the Canadian Army Medical Corps, which was being sent to South Africa. The Canadian Medical Corps has been organized very recently. It consists of 18 units, 8 bearer companies, 8 field hospital companies, (there should be 9—there are 2 to be organized in the west shortly.) The hospital which we sent to South Africa is a part of the 10th, because it was not a part of these units pre-existing, but was made up of the existing units who volunteered to go to South Africa. This field hospital is organized according to our own lines. We do not follow the British organization at all. We have started out for ourselves, adopting an organization and personnel which we deem to be the most suitable to modern requirements. Our field hospital on a war footing has its own transportation. It has a transport section consisting of 21 men, non-commissioned officers,

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\*Remarks before the 11th Annual Meeting of the Association of Military Surgeons of the United States.

drivers, collar-makers, etc., who have charge of the transport exclusively, and who are trained to act as orderlies on occasion; and a hospital section consisting of 40 men, making a total of 61 officers and men, five being officers. The problem to be solved was to provide this unit with a suitable transport. The ordinary transport wagon which we have adopted for the Canadian service was good in its way; but as you have heard stated this morning



**Tenth Canadian Field Hospital Transport Wagon or Four Litter Ambulance.**

by Colonel Havard in his admirable treatise—I will not call it essay—you know how essential it is to evacuate a field hospital as soon as possible; that is, to see that the sick and wounded are in the least time possible sent to the rear to a stationary or base hospital, if possible, or to a railway or steamboat station where they can be shipped to the rear. It then struck me that if the transport wagon of the field hospital could on occasion be utilized

as an ambulance wagon it would serve a most useful purpose. I therefore hurriedly contrived one transport wagon. Our transport wagons are very light so as to endow these field hospitals



**Transport Wagon with Cover Raised.**

with the greatest mobility possible compatible with the loads they have to carry; and I contrived means of carrying four reclining patients in one wagon, two litters being on the floor of the wagon, and two litters on an upper tier, the forward handles of the stretcher—or litter as you call it here—resting on the back of the driver's seat,

and the rear handles resting on a light folding trestle which I contrived and which was found to be exceedingly strong and solid and to answer the purpose very well. The wagons are light. They weigh about 1100 pounds. They are made of the best materials and run very easily. They have a cover with hoops which can be easily removed. Two years ago I came to Washington with the idea of examining your methods of transportation and getting your ideas in selecting an ambulance wagon. I found here the wagon which you saw yester-

—resting on the back of the driver's seat,



**Transport Wagon. Rear View Showing the Litter Rests.**

day at the Barracks. I thought it a very excellent model and I got authority to have ten made to thoroughly test them in Canada for our bearer companies—not for our field hospitals. We found them good, but we found some objections to them. I have made some modifications which I consider improvements. I think that one of the great objections to your ambulance wagon is the difficulty of transporting it. It was so high you could not get it in a railway car,



Transport Wagon with Cover down. Rear view.

supposing you had to send it 50 or 100 miles away. It would not go between decks of steamers; sometimes it would if you took off the wheels, but even then it was only with great difficulty that you could get it down to the steamer; and the rigid top I found very much in the way. It would have been impossible to send it as a transport to South Africa—quite out of the question, as it would take up too much room on account of the high, rigid top, and so on. Well, the transport wagon which I have sent packs in its own box, so to speak. The wheels are taken off and placed in the box. The hoops of the cover are taken down and tied together in a bundle and placed in the box. The seat goes there also. The canvas cover folds up like a small tent and goes into the box of the wagon; so that each wagon occupies no more space on board a steamer or transport than the size of the box, which is 8 feet 6 inches in length, 4 feet in width, and about 18 inches in depth.

I will pass among you a number of photographs which I brought for my good friend, Captain Munson, who has been of great service to me and exceedingly kind: I brought these pho-

tographs simply to give them to him. He was good enough to have them mounted, and I pass them to you so that you may see them. There are four photographs of the same wagon. They explain themselves.

There are some features about this wagon which also may appeal to you. With regard to the cover, it is not buckled down or hooked down. It has brass eyelets let into the canvas cover and it is fastened by small ropes. The objection to buckles is that they get broken or pulled out. The objection to hooks is the same—they get lost, pulled out, the buttonholes tear, etc.; while these covers are not likely to give any trouble from that cause. On the covers are painted very large Geneva crosses on each side, fore and aft, so that the wagon can be recognized as an ambulance wagon at a very great distance. This wagon is provided with a number of accessories which I deem would be of very great use in campaigning. I have made out a list and will read it to you:

#### ACCESSORIES.

##### *Strapped under Body of each Wagon or in Box of Seat.*

1 spade,	1 axle grease box,
1 pickaxe and adze,	1 package nails,
1 axe,	1 package screws,
1 handsaw,	4 horse shoes,
1 water tank and sterilizer with trestle (8 gals.)	1 package horseshoe nails,
1 mess kettle,	1 lantern,
1 jack,	1 screw driver,
1 leather water bucket,	2 field stretchers, (Mark O)
1 trestle for upper stretcher.	1 bannerol staff,
1 oil can,	1 wrench
	1 jointed 16 ft. staff for each 4 wagons.

When this field hospital arrived in South Africa it had its first inspection. The Principal Medical Officer was exceedingly interested in this equipment and particularly in the appearance of these wagons. He was so much impressed that he immediately had them measured, specifications taken, and ordered a number to be sent to Johannesburg to replace such of the medical corps wagons as had broken down or had become unserviceable, etc. So, to begin with, they seem to have been very much

pleased with them. Of course I shall receive official reports in due time with regard to all this equipment.

I now pass to you photographs of the water tanks which we also designed for this field hospital. We were not quite satisfied with the ordinary water tank. The new tank is provided with five faucets. Another feature is the bunghole. I took the idea of the bunghole from the port hole of a ship with which you are familiar. Our covers are made exactly on that pattern and we find it exceedingly suitable. There is no loss of water. When the cover is screwed down it is perfectly secure, and then it has



**Tenth Canadian Field Hospital Water Cart.**

a large opening. It is about the size of a port hole shutter. It is exactly the size of an ordinary air port and answers the purpose exceedingly well.

Field hospitals also require a forage cart. In the British service it is a 2-wheeled cart. It is heavy and cumbersome and does not carry as much sometimes as one would desire. I think that the ordinary light express wagon used for delivery purposes, or runabout wagon, would answer better. This runabout wagon is provided with a similar cover to the transport or ambulance wagon, photographs of which are circulating among you. It is also provided with the red cross. This runabout wagon has two

seats, removable, and it is found most useful in connection with the field hospital for various purposes. They can drive fairly



**Tenth Canadian Field Hospital Forage or Runabout Wagon.**

fast with it and can put on a team of horses, if desired. It has a pair of shafts, but the poles of any transport or ambulance wagon are attachable to it; and this wagon has been found to be of the greatest use in connection with each field hospital.

I must tell you, gentlemen, if you will permit me, that I have been very much impressed with your medical and surgical



**Forage Wagon without Cover.**

chests. We would call them panniers. I prevailed upon our authorities to consent that one-half of that field hospital should be equipped with a set of your panniers or chests. The other half is provided with the ordinary British medical service pannier. I know that on arrival the British medical officers who saw these strange panniers were very much impressed by and very much interested in

**Forage Wagon with Cover and Rear Seat Removed.**

them; and we shall know how they compared in actual service with the British pannier. My idea is that the outcome of this practical experiment will decide what we shall finally adopt for our service.



**Forage Wagon with Cover Down. Front View.**



## THE VACCINATION OF PORTO RICO—A LESSON TO THE WORLD.

BY AZEL AMES, M.D.

MAJOR AND BRIGADE SURGEON OF UNITED STATES VOLUNTEERS.

THE Medical Corps of the Army of the United States, as constituted for the Spanish War, and the duties which grew out of it, was created and put into the field, as all know, in hot haste.

Its nucleus, consisting of the medical officers of the Regular Army and those of the State regiments, hurriedly mustered in as U. S. troops, was too small, and was too weak in men of previous active service, to do much in the instruction, or even the direction, of the host,—chiefly of young, untrained practitioners from civil life,—who took the field with the Volunteer contingent, or as Acting Assistant Surgeons.

Overborne, with imperative primary duties, chiefly of general organization and administration, the few officers of the Regular establishment had neither time nor strength for more, and the new men, often of anomalous military *status*, settled themselves to their complex and multiform duties with only the most general instruction from competent authority, often without any.

The efficiency, general good conduct, and the varied and remarkable achievements of this young untrained host (to whom by far the most of the medical work of the Spanish War and its immediately resultant service, fell), are the highest possible tributes that could be paid to the patriotism, character, ability and *esprit du corps* of the Medical profession of the United States, from which it was so hastily recruited.

Probably on no other body of medical men in the world could equal reliance have been so confidently and safely placed;—probably by no other could an equal record have been made.

I count among the most sagacious and patriotic acts of the distinguished officers responsible for the medical efficiency of the U.S. Army, Navy and Marine Hospital Service and their associates, of the National Guard, their zealous activities in the organization and support of this Association, especially designed as it is, to keep alive and virile, to shape and strengthen for service with the Forces, when needed, the interest, capacity, adaptability and devotion which made that record possible.

Although the fighting forces of the United States Army raised for the Spanish War, had (until the sequential conflicts in the Philippines), but little experience of hardship or battle; confronted with new and grave matters of governmental organization and administration, they gave, in slow and patient service, broad, admirable, and beneficent, the full equivalent of the brief but splendid work of the Navy behind its guns.

In this potential service of the Army, which alone could fast-color the results of the National victories at arms, by land or sea, the Medical Corps although largely volunteer, has taken front rank, as proven by its achievements, whether judged;

- (a) by contrast with the achievements of others;
- (b) by the magnitude and importance of the problems it has worked out;
- (c) by the exceptional—even unique—conditions and difficulties under which they were solved; or,
- (d) by their enduring and far-reaching significance,—their effects upon mankind at large.

It is necessary to cite but four examples to bring to mind the long possible list which establishes the claim I have made for the Medical Corps. I name but four,—widely differing in feature and relation,—viz:

The demonstration,—on a scale and under conditions to place it beyond doubt or cavil,—of the ice-bath in enteric fever:

The absolute demonstration by Ashford and others,—whatever the previous knowledge,—of the entozooal origin of ankylostomiasis—(or pernicious anemia), and of the efficiency of its antidote:

The absolute demonstration by Reed, Carroll, Gorgas and others,—whatever had been gleaned before,—of the agency of *Stegomyia fasciata* in the transmission and propagation of yellow fever,—and lastly,

The absolute demonstration that comprehensive, *compulsory* Vaccination, properly conducted, will *alone, certainly* eradicate small-pox from *any* region or people,—as established conclusively in Porto Rico, in 1899.

Of the latter undertaking I may speak with full knowledge, and hence may be permitted to invite attention to its peculiar value and significance *as an object lesson to the world*.

That it is entitled to rank as such and may so serve, its pertinence, its magnitude, its triumphs over many and grave difficulties, and its entire success, as attested by the known facts and its unimpeachable records—written and physical—certainly indicate.

That there is grave and wide *need* of such an object-lesson has been but too evident in the recent sweep of the pandemic of small-pox on both sides of the Atlantic,—only just now in its decadence.

That its teachings and its competency to instruct were alike urgently requisite, the recent history of legislation unfavorable to vaccine protection,—even in the oldest and most enlightened commonwealths at home and abroad,—and its baleful results, alarmingly attest.

Moreover, it is only by just such clear, incontestible facts as the lesson of Porto Rico affords;—equally digestible and convincing to the plain people and the honest but half-educated opponent everywhere,—that the present belligerent skepticism can be overthrown.

This *need* of a world-lesson as to the imperative necessity of universal compulsory vaccination and re-vaccination is, moreover, further emphasized, not only by the world-wide prevalence of small-pox and its ready contagion, but also by the facts that long immunity from serious epidemics in some countries,—owing to more or less well-enforced vaccination—has made individuals and communities comparatively indifferent to the disease, while the

younger generation of medical men is so unfamiliar with variola as to permit frequent and disastrous errors of diagnosis in cases simulating it.

Furthermore, the world's facilities of intercourse by land and sea, have grown so marvellously; its congregations of adults in the "bee hives of industry" and of children in the public schools, have so multiplied; and the dependence of communities upon common public conveniences,—such as laundries, barbers, baths, milkmen, bakers and other vendors,—has so greatly increased, that the risks of contagion, calling for every safeguard, were never so many and so great as at the present time.

The compulsory vaccination of Porto Rico was then, no less happy and valuable as an object lesson in the matters of time and place, than in its inception, scope and results. Probably at no time during the last half-century has its influence been equally needed, or would it have been equally potent for good, either as a barrier to set back the flood-tide of opposition to vaccination both in Europe and America, or as proof-positive of the absolute efficiency and safety of vaccination in the prevention and extermination of variola.

There can be no question that both in Great Britain and the United States, considerable honest doubt, (greatly stimulated, however, by the unscrupulous) has long existed, as to the efficacy of, and the degree of protection afforded by, vaccination, and as to the transmissibility thereby of human or bovine disease. Overbroad and unwarranted claims as to the permanency of the immunity it gives, made by zealous but half-informed and indiscreet advocates, and the very possible ill results of former arm-to-arm vaccination and the earlier uncleanly methods, have naturally given rise to distrust.

In Great Britain, those who honestly held these doubts and distrusts—joined with others "invincibly ignorant" or vicious,—had grown in 1897, despite the splendid results achieved by vaccination for mankind throughout Christendom, for more than a century, sufficiently strong in numbers, organization and influence to wring from the reluctant Ministry and Parliament the enactment of the so-called "conscience clause," thereby *modifying so as to emasculate*, the compulsory vaccination law of the Kingdom.

It is safe to say that no such step backward, in its relation to the physical well-being of mankind has ever been taken by any enlightened Nation. Already its cruel effects are seriously and painfully apparent both throughout the United Kingdom and its dependencies, and in every land with which it holds intimate intercourse—,especially in the United States.

For the originators and donors of this great boon to mankind thus to minimize its value and throw doubt upon its beneficence was a blow to humanity and an encouragement to the ignorant, prejudiced and irresponsible, the cost of which can never be computed, but has already attained fearful figures. The largely increased percentage of infant mortality from variola and the very large falling off in re-vaccinations, already recorded in the United Kingdom, are due beyond doubt, to the relaxation of protective measures permitted by this change in law. The increased distrust and antagonism created in *this* country, by the action of the British Parliament, has unquestionably been responsible for the neglect of thousands to seek the protection of vaccination and re-vaccination for themselves and their children, from which neglect has already certainly sprung a considerable measure of disease, distress, commercial embarrassment and death.

While it is needless to recall in this presence, the dread history of the ravages of small-pox over the world's surface, until countered, first by inoculation and then by vaccination, it is competent to note, that, despite the vast improvement wrought by these instrumentalities, small-pox still holds the first place in the list of preventable, readily-disseminated, contagious diseases, common to all parts of the habitable globe,—tuberculosis possibly alone excepted.

With all the contrariety of credulity and skepticism; the love of sensation; the abnormal self-assertion of the half-informed; and the mistake of license for liberty, for which this age stands preeminent, there is still in the minds of the masses, a hunger for *truth*. Facts, finalities and sure anchorages for beliefs are, in general, sought for and welcomed, and, as in all ages,—bring sure results.

It may rightfully therefore be counted, I think, as more than fortunate, that, just upon the heels of the lamentable mistake of

Great Britain, the new Nation which has sprung from her loins, and taken first-rank as a world-influence, should have been able to furnish for all peoples, both check and antidote to the effects of her error, in the exceptional work and the assemblage of facts and evidence, which it fell to the Medical Corps of her Army to develop in the general Compulsory Vaccination of Porto Rico.

All analogous experience indicates that, in proportion as communities are taught and given confidence, by plain, indubitable *proofs*, first;—that proper vaccination and re-vaccination will prevent and eradicate small-pox, and second;—that they will do no harm to the individual,—both which propositions have been abundantly demonstrated and should be everywhere established—opposition, however hostile, will steadily diminish and ultimately, practically cease.

In view of this reasonable certainty, it would seem no less an imperative duty of officials and of Government everywhere, to gather, and when gathered to make known, in simple, well-digested form, available for all, the sure and vital evidences in regard to vaccination and its concomitants, than it is to enact laws and enforce them, for the education of youth and the prevention and restriction of disease.

Self-government born of intelligence, calls for little law and less enforcement of that law.

I shall be pardoned, therefore, for suggesting that it is to be deeply regretted that any causes, should have kept from becoming available in proper form, for the present great need of the Nations, the unequalled and invaluable data, carefully arranged-for and gathered, in the unpredecented vaccination of the million population of the only "white" island of the Antilles.

Comprehensively projected and gathered at great cost, and in excellent form for verification, it is alike strange and true, that this great volume of data, after being utilized superficially for Report-purposes, was cast aside and neglected, till recently rescued, re-assembled and arranged by the writer, under Governmental authority, that it may officially give, its new, unique and invaluable teachings to the medical profession and the world.

For a consummation so hopefully useful and beneficent I

may, I am sure, confidently bespeak the zealous approval and support of this Association and the profession at large.

#### THE EVIDENCE OF PORTO RICO.

Hardly had the last of the representatives of Spanish misrule turned their backs upon the Island before the American military administration, though wholly new to the science and art of Colonial government, set on foot, as an act of beneficence to her newly related people, the compulsory vaccination of the entire population, and—as primarily essential—the production for that purpose, in the island itself, of the requisite bovine lymph.

The American army under General Miles landed in Porto Rico in July, 1898, and gradually occupied the island, working eastward, westward, and northward from Guanica, Ponce, and Arroyo on the south coast, until it was in full possession. The last of the Spanish army and its adherents left the island in October, 1898.

A considerable naval squadron; a much larger fleet of army transports, quartermaster's vessels, etc.; a Spanish army of some 11,000 fighting men and attaches, and the American army of 8,000 men and adherents, had doubtless contributed each its quota to the grand total of cases of variola, always more or less prevalent among the population during the Spanish régime. In some of the principal places, such as Ponce and San Juan, the local health authorities had kept up a desultory, but altogether ineffectual, oversight and partial isolation of the disease, with a feeble effort at vaccination.

Under the more or less efficient supervision soon established by the United States military authority, this local oversight and control were sufficient to accomplish for a time, a considerable degree of repression of the disease in the chief places. Practically unchecked, however, in the outlying villages and the hill-country, and aided by the peregrinations of the unsettled inhabitants and the troops, it steadily took on greater proportions, no part of the island being free from it, until nearly all the country *barrios* (precincts) were infested and its reflex tide began to work back into the larger towns and cities. For the first time in the cognizance of American sanitary officers, the spectacle was pre-

sented of the non-populous regions feeding the disease to the cities and towns, a condition of things which it will readily be seen, greatly increased the difficulty of control. Where, as in the United States, the usual primary centers of the contagion are a few large cities or manufacturing towns, the task of restricting it is obviously much easier, and its spread is much less rapid, than when a score or two of small and scattered communities, without sanitary regulation, are sending it daily to the market-towns and cities about them.

It was therefore not only a rapidly spreading and, indeed, a general, diffusion of variola throughout the rural population of Porto Rico, with but little less activity in the cities and towns, embracing altogether nearly a million souls, that confronted the American military authorities at the opening of the year 1899; but the conditions favoring its spread, and hampering the only measures which could be effective in controlling it, were quite exceptional, some of them creating difficulties seemingly almost insurmountable. Among the factors especially favoring the spread of the disease were (1) the tremendous headway it had already attained and the numerous centers of contagion existing; (2) the comparative indifference to it on the part of the mass of the native population, so long habituated to it that it was apparently regarded as inevitable and irremediable; (3) the absence of systematic sanitary authority, oversight, or regulation, and hence the maximum of difficulty in ascertaining the whereabouts of cases; (4) the antipathy of the natives to removal from their own homes to hospitals or camps, for isolation and treatment, leading to habitual concealment of cases both in country and town; (5) the unusual facility afforded the spread of the disease by the density of the population, its over-crowded habitations and its "hand-to-mouth" habits of living, the latter compelling constant passing to and fro between country and town with, or for, supplies; (6) the very congenial climatic conditions, and (7) the uncleanly character of the habitations and their surroundings, of the air, water and food commonly used, and of the habits of the people.

Among the conditions exceptionally hampering the measures of restriction and control, were (1) the great difficulty of furnish-



ing isolated care and treatment in pest-houses and camps for the hundreds of cases simultaneously occurring, owing to the great and inaccessible area over which they were spread; the inadequacy of transportation, (there being often no roads) and the paucity of help; (2) the absolute impossibility of isolating the stricken in their crowded and thickly-set homes; (3) the very small number (proportionately) of physicians and medical apprentices, to the population; (4) the very great difficulties of travel in the hill-country and hence the inaccessibility of a large part of the people, either for treatment or for vaccination; (5) the seeming impossibility of procuring any considerable supply of proper vaccine virus on account of the distance of the ports of the United States (from which alone it could be brought in any quantity) and the attendant cost; (6) the difficulty of preserving the virility of the virus in its passage to the Tropics and after its arrival, it being found that very little virus sent from "the States," (especially the glycerinated), retained its efficacy when received; and (7) the great difficulty, even with plenty of virus, of vaccinating these hundreds of thousands of unregistered people, mostly ignorant and scattered, speaking foreign tongues, and unused to sanitary control.

The only conditions exceptionally favorable to the suppression of the disease were (*a*) the facts that, as the population was insular, the spread of variola was limited by the sea-boundaries; (*b*) that there were ample authority (civil and military) men, means, and material to work with; (*c*) that the supply of young cattle for the production of virus was large, easily gathered and of excellent quality; and (*d*) that a large percentage of the adult population had already had the disease, lessening the number requiring vaccination and the amount of fuel for variola. Private enterprise had, under the stimulus of Spanish municipal contracts, kept feebly alive, two very small farms for the production of bovine lymph, but both were nearly moribund at the American invasion, and no reliance whatever could be placed on either the amount, or the character, of their "output." Every effort at general vaccination made by the Spanish authorities had broken down, chiefly from lack of purpose, virus and vim.

Early in December, 1898, General Guy V. Henry, who was especially interested in sanitary matters, became Military Governor.

On December 29th, General Henry, "because of the intelligence received from the *Alcaldes* of different parts of the island of the rapid increase of the disease, "directed the promulgation of an "order," by "Circular" of his chief civil officer, the Secretary of State, to the several *Alcaldes* (mayors), requiring them, as civil officers, to carry out universal vaccination. This purely civil "order" was reinforced January 3, 1899, by a military "General Order," addressed however, expressly to the *Alcaldes* and boards of health. This "order" indicates how very difficult it sometimes was, to keep distinct, in thought, speech and action the military and civil functions of the Military Governor, in whom, for the first time in the history of the United States, under such conditions, they were so peculiarly combined, each interest having independent existence and recognition, independent sources of revenue, and a full, independent, official staff.

It is at this point therefore, though only to the extent of the promulgation of civil instructions through a military order, that there first appears an Army relation to the great vaccination work, later borne principally on Army shoulders. Always *in name*, a civil undertaking; carried on under the direct local supervision and co-operation of the several *Alcaldes*; paid for chiefly out of Insular and municipal funds, (though in part by the military chest), it was organized and directed wholly by medical officers of the Army, chiefly volunteer, and largely executed by them and the men of the Army Medical Corps. To the great credit of both military and civil officers it may be said, that there was at no time, any friction between them in the discharge of their duties.

On the evening of January 7th, at the urgent request of the Chief Surgeon, Col. Hoff, the writer sought the Commanding General and first made the suggestion, already made to the Chief Surgeon, that the virus be produced in the island. The suggestion was warmly approved as soon as fully understood, the General saying as the writer left, "I will give you all the authority

you need, all the men you need and all the money you need, if you will give me that virus and give it to me quick." These promises he fully redeemed.

Having received verbal orders, the writer reported to the Chief Surgeon the results of his conference, and that he had urged that the oversight and direction of the undertaking should be placed in charge of the Chief Surgeon of the Department, as the liberal use of the Army Medical Corps and the free use of Army men and material would be absolutely necessary to success. To this proposition the General, after a time, gave a reluctant assent, premising that it must be an Insular (civil) undertaking, conducted through, and in co-operation with, the *Alcaldes*, though having from the Army all possible assistance.

As the result of this report and to secure the requisite orders, the Chief Surgeon sent on January 9th, the following communication to the Adjutant General of the Department.

"SIR: I have the honor to recommend that a sufficient amount be allotted from the civil funds to permit of the immediate starting of a vaccine farm here, to render effective the order requiring universal vaccination among the people of the Island; and that Dr. Azel Ames, Acting Assistant Surgeon, be placed in immediate charge of the work."

The *practical* inauguration of the vaccination of Porto Rico seems to have dated with the definite proposition to produce the requisite virus in the island.

Having selected the field of his cattle operations (the equilateral triangle of fine cattle-country having its apex at Coamo Baths and for its base-line the south—(Caribbean)—shore of the island, stretching eastward from Ponce some thirty miles;) having chosen his immediate assistants and largely perfected the working plans for the production of a million vaccine points, the writer reported the same to the General Commanding and after a long conference with the Chief Surgeon over the plans of vaccination-organization, etc., asked for the issuance of orders putting the entire work into its essential relation to the military authority, and under the general charge of the Chief Surgeon.

The writer would be recreant to every dictate of grateful appreciation and equity, if he failed to record here, the splendid

support given the undertaking and himself, in its organization and conduct, by the late Gen. Guy V. Henry, Military Governor of Porto Rico, and the Chief Surgeon, Col. Hoff, our honored President; by the untiring and zealous staff of young Acting Asst. Surgeons,—Drs. Timothy Leary, Louis L. Gilman, Richard Wilson, S. H. Wadhams, J. Reddin Kirk, S. J. White, H. M. McConathy, and Gustave Moret, who chiefly did the work; by the fine young men of the Hospital Corps, and by that rare man, Mr. Simon Moret,—the Porto Rican cattle-intermediary, upon whose broad shoulders the success of the whole fabric rested.

On January 26th and 27th "orders" were issued carrying the organization agreed upon by Colonel Hoff and the writer, into effect. The "General Order" (No, 7) of January 27th, reaffirmed the previous "orders," civil and military, directing universal vaccination, placing the work under military supervision and conduct,—though under civil auspices, and the conjoint control of the *Alcaldes*—and the great, earnest, fully-organized campaign against the fast-spreading epidemic was begun. The working forces were soon in the field, and from this date the double task of virus production and the simultaneous vaccination of all sections, never stayed until it ceased,—because completed,—on July 1st, just five months later, the population vaccinated, the disease literally "starved out" and driven from the island.

*The Virus Production.*—The Chief Surgeon (Colonel Hoff) in his report of 1899, has truly said:—"To produce the virus a vaccine farm was necessary; to introduce the lymph into the arms of several hundred thousand people required a subdivision of the assignment of Directors, etc. . . . . But the infinite detail of the work and the herculean labor, mental and physical, entailed in carrying it to a successful result cannot be appreciated by those who have never had a like undertaking to accomplish."

To create the virus was, of course the prime necessity. The grand scale on which the operations were conducted, practically in the open air, in a new country, by unskilled hands; the speedy accomplishment and the unparalleled success, perhaps entitle this part of the undertaking to more than passing notice. After a thorough inspection of every feature of the Vaccine Station and

farms, General J. C. Breckenridge, Inspector General of the United States Army, wrote of the work (Report 1899, to the Major General Commanding the Army. p. 68): "On the morning of the 23d [March] we examined the Vaccine Station under the charge of Dr. Ames at the Baths of Coamo. . . . It seems one of the best energized and organized and, despite the considerable difficulties, the most successful and thorough undertaking that has characterized the American occupation." To establish and keep in full operation the Distributing Station of the United States Vaccine Corps and the adjacent cattle farms, indeed demanded unremittingly, the exercise of much judgment, careful planning, effective organization and hard work. To get together the requisite number (1,240 head) of young cattle as needed, to handle successfully, select, test, feed and use them, at minimum cost and loss, in a strange country and with 'green' hands, presented a series of practical problems each of which afforded ample scope for every faculty and acquirement,—all of them rich in incident.

It was first of all necessary to secure the supply of young cattle without great cost,—which would of itself have been prohibitive,—to locate them conveniently and subsist them for a considerable period; to procure from the United States, (1,800 miles distant by sea), the best possible (initial) lymph with which to vaccinate them, together with the appliances needful for vaccination, such as ivory "points," material for packing, etc. and for pathological tests, tuberculin, syringes, etc. It was equally necessary to organize, fully equip, house and subsist a corps of over one hundred men, with expert pathologists, and executive staff, surgeons, cattle-experts, guards, couriers, assistants and teamsters; to arrange for regular supplies of all kinds; for large numbers of draft and saddle animals and their equipment, and for efficient transportation, all under military order and discipline; and finally, to keep the whole so effectively at work that there should be no loss of time, and as nearly as possible, a daily output of not less than 16,200 charged virus "points" from the farms, of which 15,000 must be sent daily, carefully registered and packed, to meet the requirements of the vaccinating forces, steadily and systematically at work in all parts of the island.

The objects to which all lent their utmost endeavor were, to turn out daily, the needed amount of the very best lymph; so to handle, keep and transmit it that it should preserve its virility, and, in competent hands and conditions, successfully do its work. and finally, both to keep and to transmit with each package of virus, the full record of its production, that the origin and full history of every "point" used, might be known to its user whenever desirable. The difficulties to be overcome, as suggested by the Inspector General, were neither few nor small. They are in part mentioned here, only that any who may be called in the future, to a similar undertaking, heavily handicapped, need not be dismayed. •

Glanders and farcy were spreading in the Government *corrals* from which it was necessary to take the first fifty or more horses and mules, necessary to the very vital transportation of station and farms, and,—being dangerous to both men and animals,—were, for a time, the source of much anxiety. Many of the principal supplies, such as the ivory "points," the initial virus, the tuberculin, gutta-percha, and other packings, instruments of all kinds, formalin, chloroform, medicines, fresh meats and much other food, had to be brought from "the States." Fresh beef and ice in large quantities had to be regularly supplied and were teamed, almost daily, twenty-three miles, up the hilly military road to the camps. Competent men (though all inexperienced) and good cooks must be found, able to stand severe physical strain for months, while a large part of the necessary "plant" such as vaccinating tables, packages, etc., had to be designed by the writer and constructed by the quartermaster mechanics. Refrigerator service and appliances, while most essential, were almost without existence and had, at first, to be crudely created, and it was a matter of extreme difficulty so to keep, pack, and transmit the fresh lymph, under the tropical sun, that it should arrive at its destination still virile. Severe drought, and consequent low water and short pasture were grave troubles, and at one time seriously threatened to stop the work.

The screw worm, the larvae producing which is laid in all abraded and open wounds of bovine animals in Porto Rico, speed-

ily hatching the worms in great numbers, gave infinite trouble. These worms burrowed deeply if neglected, and rapidly destroyed the soft tissues, and even the life of the infested animal. It was perhaps, the most serious of the troubles encountered, doubling anxiety and labor and much increasing the cost. The sudden loss, (by peremptory general order of the War Department discharging them) of a large part of the most competent men, largely of the Army Hospital Corps, was utterly demoralizing and for a few days threatened to disrupt the work. It was necessary in many cases, to hire the same men at double the wages, as civilian employes, leaving only "contract" control over them. Losses of cattle by escape and theft and insufficient camp-guard; the necessity (because new ones were not received) of re-using old "points", weakened and curled by the thorough processes of cleaning; and the drinking and gambling habits of a small percentage of the men, were all considerable difficulties at times, where absolute regularity and system were indispensable. The initial difficulty, and a cause for a time, of the utmost anxiety, was the character of the lymph sent from "the States" with which to vaccinate the cattle. Experience had shown *all* virus so sent to be of doubtful value; nearly all,—especially the glycerinated,—had proven inert with the troops, and it was a serious matter to bring together such an assemblage of men, cattle and materials, the success and utility of which must all hinge upon the virility of the initial virus. Happily, enough proved virile to start the local 'stock' and secure safety, though not before the writer had experienced a great alarm, had spent the worst and most anxious twenty-four hours of his life and had learned some new facts as to cattle vaccination "in the field," and in the Tropics.

After some forty cattle had been duly tested and vaccinated and the proper time of incubation had elapsed, search was made for the hoped-for typical vesicles which one is accustomed to see upon vaccinated calves in "the States". Not one was to be found, and the disheartening indications were, that all the virus from "the States" had failed,—as indeed most of it did. Twenty-four hours later, unwilling to believe that *all* had failed and that the undertaking must be abandoned, or recast, another and most careful search was made by the writer and Dr. Timothy Leary,

A. A. Surgeon,—the invaluable pathologist in charge of the cattle,—which changed deep disappointment into jubilation, for though no vesicle was then, or afterward, discovered, plenty of typical crusts or cones were, which, being removed, gave typical lymph-yielding bases in abundance. It soon became evident that the heads of the cattle not being confined, as in vaccine stables in the United States, their rough tongues doubtless broke the vesicles as soon as formed, as did often the underbrush, and the rough stubble and coarse grass on which they lay. The crusts resulted, and from their indurated ring-like bases the finest lymph freely exuded and was gathered in great quantities, the "out-put" of the farms reaching the surprising figures of 27,000 double-charged "points" (for a single day), under the efficient management of Capt. Fredk. P. Reynolds, Asst. Surgeon, U.S. Army, who took charge of the Station at the last of the work, the writer having been ordered to "the States" ill.

The very remarkable and carefully recorded experience determined conclusively, several basic facts as to vaccine-lymph and its use, viz: (1) That vaccine lymph, especially when glycerinated and in tubes, did not retain its efficacy when exposed—even very briefly and without great variation of temperature—to the change from a temperate to a tropical climate. Though the reason does not appear, the *fact* is indisputable, and all countries in the tropical zone should produce their own virus if so fortunate as to start a "stock:" (2) That given virile initial lymph and good cattle, the very best of lymph can be secured (by practically the same methods) in the tropics, as well as in colder countries, provided care is taken to protect it (as soon as 'taken' and until used) from alterations of temperature: (3) That the glycerinated virus has nothing to recommend it for tropical use, (if it has anywhere, and I share the doubt of Dr. Weston and the N. Y. Medical Journal upon this point) and that glass tubes are worse than useless: (4) That a good, carefully-kept virus, has, in the tropics, equal (if not greater) activity and efficacy with that in northern latitudes, though it ought not to be kept as long: (5) That it is much better, in the hot countries especially, to confine the vaccination upon animals for virus, to a definite number (say twenty) of abrasions on each side, rather than to make extensive.



parallel, linear incisions and secure thereby many *lines* of vesicles. By the latter the specific fever created is much too great and is most undesirable, while the ravages of the screw worm, if it effects a lodgment) in such extensive incisions are difficult to manage: (6) That in field work, nothing is so good with which to vaccinate an animal, as the ivory "point", the tube being useless, and nothing is so good to "take" virus with. Surely nothing is so serviceable for the vaccination of the people,—or is even practicable—in a hot country: (7) That there is every warrant for positively asserting that although syphilis, tuberculosis, elephantiasis, and tetanus are common in Porto Rico, *in no case has it followed that any of them, or any other disease, bovine or human, was imparted to an individual by the process of vaccination.* I fully agree with Crandall, who truly says, in his excellent treatise on vaccination, that "no disease except vaccinia is conveyed by the lymph as prepared today by responsible makers." With tetanus so common in the island that 818 cases occurred in seven months of 1900–1901, a single case only (in an infant) occurred after vaccination in 860,000 vaccinations, and this, of course, would have occurred as readily, with *any* abrasion: (8) That it is not advantageous to use cattle older than yearlings, that the sexes are of equal value, and that there is little or no tuberculosis in cattle living "in the open," and (9) That it is of importance, and well worth the little it will cost, to keep alive a good "stock" of vaccine lymph in any tropical country, (especially if insular) even when little, or no large, need exists. The frequently recurring demands for virus for infants and those who will be revaccinated—if wise—call continually for more or less lymph, and larger drafts can soon be met, if a good "stock" is maintained, as it easily can be.

*The Vaccination of the People.*—Of course, in such a country and with people in such circumstances, the difficulties of organization and work were many and some of them novel. The long habit of submission to authority, the experience already had at the hands of the Spaniard, (who had really made some commendable efforts at general vaccination in former years, but had failed), and the wholesome respect for the American officials,

doubtless all contributed to minimize opposition and secure obedience to orders. The rapid spread of the disease and its high mortality all counted; but the master-stroke which secured prompt and personal interest in being vaccinated was the promulgation of a "circular order" now famous as "Circular No. 3," prepared by the writer and issued by General Henry, which made the possession of a vaccination certificate a pre-requisite to employment or pleasure. As soon as it was made evident by this "circular" that it was to be made "a bread-and-butter matter", from hills and valleys, hamlets and municipalities, young and old flocked to the vaccinators wherever located, and fairly tumbled over each other for precedence,—like John Chinn's Wuddahs," in Kipling's story ("The Tomb of his Ancestors") of the vaccination of the Satpura Bhils. Often two or three hundred, old and young, would be still waiting, unvaccinated, when darkness closed the day's labors. Sometimes the vaccination was continued by lamp-light to relieve the pressure.

To the *Alcaldes* and their assistants, the *commissarios de barrios* and to the local physicians and their *practicantes*, great credit is due. Few of them knew any English, and that they so nearly comprehended and carried out the plans and instructions of organization, and accomplished so much, so effectively, is indeed matter of surprise. *Alcaldes* were charged with appointing the physicians and their *practicantes* (the vaccinators) upon the nomination of the Directors of the several Divisions; with providing clerks, assistants, rooms, and conveniences, and with the most important duty of distributing the fresh virus, (daily received from the Vaccine Station at Coamo), to the several vaccinators, wherever at work, in their respective Alcaldias. The service was marvellously-well performed; largely by foot-runners, and with a degree of success that would have been impossible to any other agency.

Vaccination is, of course, in general, much the same wherever performed. There were, however, no breaking tubes, no dull and dirty lancets, no diluted and sophisticated virus, but in their places the clean, freshly-charged ivory "points" with nothing but pure lymph on their faces; their sharpened edges most

excellent substitutes for the always suspicious lancets; and there were full records of the work done, and the ardently-sought neat, durable "official" certificates.

Among the new and notable feature developed in the vaccination itself, were the following: (1) Contrary to the fact in northern cities and towns, and even in the country, house-to-house vaccination was practically impossible, (except in very few places) and the people were obliged, as a rule, to come to the vaccinators, the necessity for having their certificates being the prime check upon them. Full registration at, and not before, wherever possible, was found to be and is, a wise precaution; (2) Vaccination with the sharp edges of the virus "points" was alone practicable under such conditions; (3) The danger of infection of the abrasions made, even when but little preliminary effort at cleansing occurred, was practically *nil*, but it became considerable from dirty finger-nails, clothing, etc., when the vesicles formed and scratching resulted. Yet in no case were there really serious results, notwithstanding hot water was not readily available; (4) Cleanliness, and light antiseptic dressing were all-sufficient to prevent infection, and hot water, freely applied, was equal to the reduction of all undue inflammation, even in the worst and dirtiest of regions.

There was, possibly, some confirmation of the belief that when smallpox is prevalent, vaccinations "take" most readily. Certainly an unprecedented percentage of successful results ( $87\frac{1}{2}$  per cent.) accompanied the Porto Rican epidemic and vaccination of 1899. Doubtless the fine quality and entire freshness of the virus, and the care with which, under explicit instructions and inspection, the work was done, and the fact that full records were kept and certificates given, contributed chiefly to this highly gratifying result. Twenty-two cases were recorded, of persons successfully vaccinated, who were "seamed and furrowed" with confluent smallpox. This, of course, indicated, clearly, that the immunity usually conferred by the disease itself, is not always permanent, even though the first attack be severe, as there can be no doubt that a person susceptible of vaccination is equally so to variola. A few cases of smallpox were reported in persons who

had evidently had the disease. Such were of course, extremely rare.

That the protection of vaccination against smallpox "wears out" more or less speedily, varying in different individuals, and that revaccination is therefore required at varying intervals, were determined beyond cavil, by abundant evidence. Numerous cases were observed in which the patient was not vaccinated until after exposure to small pox, and, being taken ill with the latter, the vaccination in every case, clearly operated to modify the attack, and in some cases, to cause the variola to abort, usually in the third stage. Many hundreds of persons presented themselves for vaccination who claimed, with apparent truthfulness, to have had repeated attempts made to vaccinate them without success, but who "took" perfectly in 1899. Whether previous efforts failed from want of care or skill, or from inert virus, or because of the former insusceptibility of the person, it is, of course, impossible to say. An interesting illustration of how effectively the best intended efforts may defeat the object in view was furnished by a list of seventy-two persons vaccinated in one of the hill-towns. Their arms were cleansed,—under the instructions of one in authority,—with a solution of bichloride of mercury. Not a single vaccination of the whole number "took", though made carefully and with fresh virus. The facts being learned, a revaccination was ordered and the *entire number was successfully vaccinated*—when the bichloride was left out.

Not a few cases were noted in which young children had evidently received immunity before birth from variola, their mothers having had the disease while they were *in utero*, and a few cases were found in which vaccinia had apparently given exemption to the child from that disease through similar conditions. Repeated attempts, made with great care, to vaccinate such children and even young adults, proved in every case ineffectual, though previous vaccination was positively denied and no evidence of it could be found.

No death from variola of any who had been successfully vaccinated in recent years, was reported among those ill of the disease, and in but few cases, was there much disfigurement. In no

case did serious results of any kind arising from the vaccination itself follow vaccination or revaccination. "Bad arms" were invariably found to be the result of needless infection from filthy or careless habits.

*Summary.*—In October, 1898, smallpox was endemic in Porto Rico; in December it was epidemic; in January, 1899, it had "honey-combed" the island; by February, there were over 3,000 recent cases and the disease was spreading "at a gallop."

In February, systematic compulsory vaccination, carefully and scientifically conducted and recorded, was begun simultaneously, and with pretty equal efficiency, in all parts of the island. It was vigorously prosecuted *for four months only*, till July 1st, when 860,000 vaccinations had been made, in a population of about 960,000. Of these 87½ per cent. were successful. The work then ceased,—because completed; the disease had practically disappeared; the fuel for it to feed upon had been consumed by the "head-fire" of vaccination. In the two and a half years that have since passed, instead of the former annual average death-rate of 621, the mortality from smallpox has been but two per annum in a population of nearly a million. Can any *honest*, intelligent person doubt, in face of these indisputable and easily verified facts, *what it was*, that *in four short months*, drove smallpox from its wide and long-time reign in the island and has since kept it out? *Vaccination alone did it, and will do it effectively, wherever compulsory legislation, properly enforced, secures its benefits to all!*

## FAVUS AND ITS TREATMENT.

By SHELDON G. EVANS, M.D.,

SURGEON IN THE UNITED STATES NAVY.

**T**HOUGH Favus or Tinea Favosa is an exceedingly rare disease in the United States, it is by no means uncommon in Scotland; and in Germany, where it is known as Wachsgrind, it is of frequent occurrence.

I was fortunate, or unfortunate enough, during a former cruise, to have been brought into close, professional relation with 139 patients suffering from this disease, all on one ship. For the method of treatment about to be described I am indebted to Medical Director Price U. S. Navy, who, at the time, was senior Medical Officer of the ship.

A report of these cases and the method of treatment employed may be of interest to the members of this Association, particularly to those who are on duty with large bodies of men ashore or afloat, for, once the disease gets a foothold on board ship or amongst troops, it spreads with great rapidity and unless prompt and active measures are taken to exterminate the fungus a bald headed crew or company will be the result. With few exceptions, all the cases here reported, occurred among the apprentice boys and did not, generally, extend to the men.

Favus usually attacks the hairy scalp, and in the cases that came under my care all were of this character. It may be well to state, *en passant* that it appears to be more severe with those who have light hair than those possessed of locks of a darker hue.

It is a contagious, parasitic disease. Schœnlein was the first to demonstrate that the straw-colored crusts found in the disease formerly known as porrigo-favosa or tinea lupinosa, and which were regarded as the products of inflammation, really consisted of a mass of fungi, the Achorion Schœnleinii.

Microscopically examined, the favi, as the yellowish crusts are called, are found to be made up entirely of the fungus, consisting of oval nucleated conidia,  $\frac{1}{8500}$  inch in diameter, free, jointed or constricted: large branching or tortuous mycelial filaments  $\frac{1}{8000}$  of an inch in diameter, filled with granules and spores and a stroma made up of cellular elements. (Quain).

Hoffman, who has cultivated the fungus, claims that it is identical with the *mucor racemosus*, but other authorities do not corroborate his views.

Lack of cleanliness seems to be the only predisposing cause of the disease, and dirt a favorable nidus for the development of the fungus when once implanted. This was however by no means true of the cases aboard ship where the strictest hygienic regulations prevailed and thorough cleanliness both of person and quarters was rigidly enforced.

The origin of all the cases here reported, was traced to an apprentice boy from Germany, who, when sent to the ship, was evidently suffering with the disease, though it had not fairly manifested itself. From him it appears to have spread to the others, mainly through the utensils of the various barbers aboard, and perhaps by the changing of watch-caps, a practice very common among the apprentices. As soon as the first case was discovered, the crew was at once inspected and the other cases found.

The diagnosis of the disease usually presents no difficulties, the characteristics being the development of sulphur colored crusts or scales (the favi). In the early stages we find the affected part studded with minute yellow bodies embedded in the skin. These spots are at first about the size of a pin-head and surround the hair follicle. Subsequently they coalesce and the scalp is covered with a thick mass of dirty yellowish scales, having a peculiar pungent and characteristic odor. On removal of the scales we find the scalp reddened, inflamed and depressed. As the hair follicle becomes overgrown with the fungus, the growth of the hair is impeded and it soon dries up and falls out. It is however, generally reproduced, but this is not always the case.

Favus is often accompanied by other parasites, but in none of my cases were other varieties found.

By a casual observer, the disease may be mistaken for impetigo, but, on close examination the favi are easily recognized and the odor is strikingly characteristic.

All writers on the subject agree that the treatment is tedious and unsatisfactory; but, it gives me pleasure to set forth the method suggested by Dr. Price, which I have been unable to find in any works at my disposal, and which gave complete satisfaction. Various preparations of mercury, I know have been recommended, but not in the form about to be described.

The hair of every patient was, of course, cropped short and kept so during the entire course of the treatment. A solution of mercuric chloride in alcohol 1 to 500 was prepared, and two stiff brushes provided. The heads of all the patients were thoroughly scrubbed with the solution every other day, for a week or ten days, within which period all the scales were removed, leaving only a yellowish stain on the scalp. Then a solution of the same strength, in water and glycerine, was prepared and the patient's head bathed therewith, twice a week. Under this treatment, all the cases rapidly improved and a complete cure was effected in a very short time, and none developed a second attack.

If the scalp is much inflamed or tumefied; a mild sulphur, mercurial or zinc oxide ointment will quickly relieve it.

The old method of treatment, with poultices, &c., would certainly have been tedious, especially with such a number of patients.

These cases were reported, in brief before, but I thought them of sufficient interest to present to this body, especially considering the liability of meeting the disease in our line of work.

If any member has met with the disease in the service, I should be pleased to learn the mode of treatment adopted; and should they meet them in the future, I would earnestly recommend a trial of this simple, but effective method.



## REMARKS SUGGESTED BY THREE YEARS SERVICE IN CUBA.

By CAPTAIN JOHN HAMILTON STONE,

ASSISTANT SURGEON IN THE UNITED STATES ARMY.

THE only apology I have to offer for the tax upon your patience, which this paper will doubtless levy, is that the whole Cuban question, both in its civil and its military aspect, has seemed to me to be especially unique from the standpoint of the military surgeon, in its involvement of and its direct bearing upon those great principles of health and humanity, which rightly fall within the sphere of our professional activities and for which we have pledged our lives and careers.

In reviewing the causative conditions which gave rise to the armed intervention by the United States in Cuban affairs, and in following the subsequent course of events even to the present time, one cannot help but be deeply impressed with the fact that sanitary considerations, problems and results have been fundamental, pre-eminent and of the greatest practical importance.

The history of the military invasion of Cuba and the later peaceful occupation of the island, has inseparably interwoven with it the story of a dreadful epidemic disease;—of its ravages; how at times it depressed and even paralyzed commerce and industry; how it had served as a great weapon of offence and defence in the efforts of a down-trodden people to throw off the yoke of bondage of a tyrannical government; and how, finally, because of its periodical incursions within the limits of our own domain, it incited an interest as to its cause and manner of propagation which, to the glory and credit of *military surgeons*, has led to its control and which will afford the means of completely eradicating it from all countries for all time.

And so the pacification of Cuba and the establishing of a free and stable form of government for a people whose deplorable political and miserable economic conditions had excited our sympathy and moved us to national action, have been neither the sole nor the most important advantages gained by the victory of American arms during the war with Spain.

The numerous sanitary innovations, the remarkably improved health condition of the island and valuable medical information will, in their full fruition, constitute the greatest achievements of importance to Cuba, America, and the whole world.

Have not military surgeons taken an active and highly efficient part in the attainment of these far-reaching and beneficent results?

In answer to this question it seems only necessary to point with pride to the names of two *military surgeons* who have risen to international prominence and won for themselves lasting laurels, because of their successful efforts in behalf of the lofty purposes for which the Cuban campaign was initiated and carried to conclusion.

To one of them we owe a great triumph for medical science, and to the other a great victory of national policy. Together, they have in their work exemplified the two-fold nature of our duties—the professional and the milito-administrative. The one, through his scientific research and experimental work, has shown the highest ideal of professional excellence in solving one of the most mysterious problems of preventive medicine; and the other, in a no less conspicuous degree, has shaped the destinies of a people and won the approving plaudits of the intelligent world.

For these reasons, and because of the ample opportunities for experience in the principles and practice of our profession both in war and peace which it has afforded,—the Cuban campaign,—from its very incipency to its fullest consummation—must ever be considered by us as pregnant with importance, inasmuch as it has attracted the attention of all peoples to a just and serious thoughtfulness of the duties of military

surgeons when viewed in the light of their broadest field of usefulness.

It was my good fortune to have been permitted to participate in the memorable manœuvres which culminated in the surrender of the city of Santiago de Cuba; to have had an opportunity of doing some first aid work under fire on July 1st, during the battle of San Juan; to have assisted in the care of the wounded at the field hospital immediately and for several days after the engagement; and to have had garrison duty in one of the most important provinces of the island during the period of reconstruction, and I offer you the results of my observations and experiences.

#### FIRST AID WORK.

On the morning of July 1st, Hawkins' brigade, Kent's division, 5th corps, consisting of the 6th U.S. Infantry, the regiment with which I was surgeon, and the 71st N.Y. Vol. Infantry, advanced along the San Juan road in the direction of Santiago. As the column moved forward, we passed a number of wounded Cubans who were being transported to the rear in hammock litters. Their wounds had received attention but it was found necessary to stimulate them and to administer morphine to ameliorate their suffering. One, I remember, had been shot through the chest, the aorta presumably having been wounded, and was moribund when I saw him. Their bearers were directed to the Division Hospital. When the column had wormed its way around past the base of the hill—El Pozo—from the summit of which Grimes' battery had begun its cannonade on the Spanish fortifications around Santiago, the reports of small arms firing and many volleys could be heard ahead. When about a mile beyond El Pozo hill and in a wooded terrain, the notorious balloon ascended and remained over the column for a considerable time. The firing became very intense in front. The leaves began to fall from the trees. Shrapnel, both from our own guns and from those of the enemy were flying over us and many exploded prematurely. Bullets began to fall thick and fast on all sides. The wounded began to drop and soon many

wounded men were brought by their comrades and deposited about me. Among the first was a soldier shot through the left side of the chest. He died before the bearers could expose his wound. Soon many wounded had accumulated. I hastened to locate a suitable dressing station and calling for assistance from one of the companies, had the wounded carried back to a point where the road was very near the river, and there, under the protection of the bank of the stream, continued to lend assistance during the afternoon. It was necessary to stand in the shallow water and by digging out the earth to make a footing in the bank for the wounded while I applied the emergency dressings. The shrapnel were falling short of El Pozo, the obvious target of the Spanish guns, and so it happened that this part of the field was dubbed by the men as "Hell's bottom."

Experience at this station taught me that first aid packets and drinking water are the most essential requisites for first aid work. Under existing regulations and the dictates of personal needs, these should be found on the wounded soldier. The next two most necessary materials were splints and bandages. To a limited extent these are furnished by the privates of the Hospital Corps from their pouches, which constitute the most important part of their field equipment. Truly, splints may be extemporized as circumstances permit, but I am of the opinion that they should be at hand in greater quantities and that in time of actual service it would be advisable to have them carried by the non-commissioned officers of the corps,—preferably by the acting stewards [sergeants], who at present carry nothing especially designed for emergency work on the firing line.

Next in importance in this work of alleviating the suffering and diminishing the mortality of war, are brandy and morphine. These valuable remedies which require careful professional judgment as to the indications and contraindications to their administration, should be at hand for the exclusive use of the surgeon. Morphine and the necessary hypodermic syringe for obtaining the most speedy action of the drug are supplied in the surgeon's orderly's pouch and brandy

should be there on such occasions also. Those surgeons, who have had considerable experience in the early treatment of gunshot fractures of the thigh and other severe gunshot injuries, appreciate the urgent need of morphine to enable the patient to tide over the period of transportation to the field hospital with the minimum of pain and discomfort.

In view of our knowledge of the effects of the small caliber, high velocity projectiles of modern rifles,—*shock* can no longer be rightly considered as the great *bête noire* to the military surgeon in the proper performance of one of his chief duties on the battle-field. And I might say as much in reference to *hemorrhage*. I saw so little of these symptoms, mark you, in any degree sufficient to deter the surgeon in meeting the indications for active medicinal or surgical procedures, that I believe them latterly to have been reduced to the minimum of severity and importance. Of course these remarks do not refer to those varieties of shock and hemorrhage which give rise to immediate death and which therefore do not come under the treatment of the surgeon. Shock has been so almost entirely absent in some of the severest cases of gunshot wounds which have fallen to my care, that I have come to regard this symptom of little or no importance as compared with the pain and the danger of infection attendant upon the infliction of wounds on the field of battle.

The infrequency of severe shock and hemorrhage has been remarked upon by the Japanese Surgeons, as a result of their observations in the Japan-China war, and also by the late Sir William MacCormac, as a result of his experiences in South Africa.

Alcohol, preferably in the form of brandy, is one of the most important remedies at the disposal of those interested in first aid work, and I do not believe that it should be replaced nor substituted for by ammonia, the latter drug being entirely too fugacious in its action and having no favorable influence over the depressed mental condition of the patient.

I do not desire to be understood as advocating a reckless or indiscriminate use of either morphine or brandy, but it

would seem that the time has come when there is a chance to extend greatly and with the utmost safety their, as yet, over-cautious and restricted use.

AT THE FIELD HOSPITAL.

While in charge of the officers' ward at the field hospital an opportunity was afforded me of seeing the different varieties of gunshot wounds there presented, and of studying the effects of the shrapnel fragments, the large, brass-jacketed, Remington bullets, and the small caliber, high-velocity, Mauser projectiles on osseous and soft tissues as a result of war. These effects have for the most part been well described in detail by others and there seems to be such unanimity of opinion in regard to them that I shall only speak of what seemed to me of special interest or importance.

As would naturally be expected, the wounds varied greatly in severity, general appearance, and accompanying symptoms. The *shrapnel wounds* were the most unsightly. One of the most ghastly cases seen was a soldier who had been struck in the face by a fragment of shell and had suffered the loss of the greater portion of the nose, the entire upper lip, and a considerable part of both cheeks. There was left a large cavity with ragged edges—horrible in the extreme.

The wounds inflicted by the *Mauser bullets* were for the most part less severe in appearance than those due to the *Remington bullets*, which latter were often deformed or had parted with their jackets during transit through the body structures. In this respect the more modern bullet is certainly the more humane.

The gunshot fracture cases were by far the most troublesome to the surgeon, most painful to the patient, and did least well of those cases entitled to a favorable prognosis. The comminuting effect of the high-velocity bullet was especially interesting. One variety of bone injury, an important example of which came under my attention, is deserving of greater consideration. I refer to that condition in which *the bone is not fractured, but perforated*. While this injury can with reasonable certainty be differentiated from fracture

by the absence of the classical symptoms of the latter and by the course of the bullet, as judged from the relative locations of the wounds of entrance and exit, yet, diagnosticated, it deserves to be treated as a fracture, because it is a most important predisposing cause to such a complication,

As previously stated, shock and hemorrhage were so infrequent that they did not require serious consideration nor active treatment. A notable exception to this, however, was a case in which I was called upon to do a ligation of the right lingual artery to control an otherwise uncontrollable hemorrhage which resulted from a gunshot wound of the tongue. The patient was in a critical condition and would have succumbed had not this surgical procedure been done as a *derrier ressort*.

The Mauser bullet wounds generally showed a surrounding area of *marked contusion* more extensive and pronounced about the wound of exit. While this was not invariably seen, probably due to differences in velocity, it showed the *explosive effect* upon the *soft tissues*, and inasmuch as the harmful results of the lateral transmission of the energy of the high velocity bullet have been limited by most writers on the subject to bones and fluid saturated and fluid containing organs, exclusive of muscular tissue and skin, it is made of record that at times the discolored area of the bruised parts extended for several inches around the wounds. In one case in which the bullet entered the middle third of the thigh, the whole thigh from hip to knee was black and blue, although the femur had not been fractured. In some instances of simple flesh wounds, the *bruised condition of the soft parts* was the most striking as well as the most painful and disabling feature of the injury.

Many bullets had been well spent from distance of flight and from ricochet, as was evidenced by the large number of lodged bullets extracted at the field hospital and afterwards when located by the X-rays.

I saw nothing to indicate that the Spaniards used an explosive bullet per se. Under present conditions of warfare, *traumatic aneurisms and aneurismal varices* seem to deserve

more attention because of their greater frequency. In my ward was an officer under treatment for an arterio-venous aneurism of the left Scarpa's triangle, having resulted from a Mauser wound of the femoral vessels.

- There was one case of *traumatic gangrene* at the field hospital. This resulted from a gunshot fracture of the femur, lower third, with a complicating injury of the popliteal vessels. An amputation was done as the operation of necessity. There was no tetanus although this disease is so common in Cuba if wounds do not receive the proper attention.

#### YELLOW FEVER.

Yellow fever occurred among the troops stationed at Santa Clara in May 1900, and began to spread rapidly. Having been ordered there to take charge of medical matters an opportunity was afforded me of gaining an intimate clinical acquaintanceship with the disease while it was still able to strike down so many innocents in such a mysterious manner. The story of the terrible epidemic which had occurred in the city only two years previously and which had decimated its non-immune population, was yet fresh in the memory of the people and did much to cause great anxiety among the military element as to the outcome. In conformity with the well known advice of General Sternberg as to the depopulation of infected localities, and upon my recommendation, the troops were ordered out of the city and placed in camp about five miles distant. This almost immediately controlled the outbreak. Only a few cases which had been incubating were returned to the hospital. The barracks were thoroughly disinfected and the troops were permitted to return, but they were strictly quarantined. The disease lighted up anew. I then recommended that the garrison be discontinued and the troops ordered elsewhere. This was approved and the men with all their equipments, camp equipage and everything which might possibly carry contagion, were thoroughly disinfected and the troops marched overland to their new stations. In this way a greater loss was prevented. However, 36 cases occurred with 10 deaths. Because of the short period of incubation of



the disease, once the secondary cases begin to appear, the surgeon is liable to find himself surrounded with the sick and dying, and swamped with work, before he is able to trace the infection to its proper focus or take the necessary precautions to prevent its spread. This fact and the almost total disregard of the proper measures of disinfection and isolation on the part of their surgeons, account for the terrible epidemics, which played such havoc with the Spanish forces during their occupation of the island.

In studying the conditions which I found upon my arrival at Santa Clara I was soon impressed with the fact that the disease was *not carried by fomites*.

Another observation, which by repetition gained credence, was that those non-immunes who came into the wards or into close relationship with the patients in the late afternoon or at night were most frequently attacked. The night nurses became sick with the disease first, while those who were on duty during the day, for the most part escaped. I was on duty at the hospital, where the cases were treated, every day from 8.30 A.M. to 4.30 P.M. and, although a non-immune, escaped. I visited the cases daily and confirmed all diagnoses made, but I never visited the hospital at night. One of my assistants—a contract surgeon and also a non-immune, was not taken ill with the disease until the outbreak had almost subsided, after a month's exposure, and in all probability would have escaped also, had he not, contrary to my advice to him, visited the hospital at night. He showed the first symptoms about three days subsequently. An acting steward on duty in my office at the hospital did not contract the disease. He did not sleep at the hospital. Another acting steward who slept at the hospital was attacked early. I became a strong adherent to the mosquito theory.

The following case which occurred later on at Hamilton Barracks, Matanzas, Cuba, did much to convince me of the probability as well as the plausibility of the views which Major Reed's board has since so conclusively proved. The facts are as follows:

A military prisoner was admitted to the prison ward at the hospital Oct. 18, 1900 and confined therein under treatment for secondary syphilis. An armed sentinel was constantly on duty at the door of the ward room. The patient was not permitted nor did he leave the room for any reason. He was made to use the close stool. All dishes and other articles used by this patient were kept separate and were repeatedly disinfected. He was not treated nor attended upon by any physician or nurse who came in contact with yellow fever cases. No case of yellow fever had ever been treated in the room so far as was known. However, this soldier contracted yellow fever November 10th, 23 days after admission and died on the 16th of the same month of a most typical form of the disease, characterized by black vomit. The prison ward was provided with a barred window kept open for purposes of ventilation. Other cases had been treated during the previous month in the isolation wards a few hundred yards removed from the main building in which was the prison ward. Strict quarantine had been enforced. The mosquito theory was the only plausible explanation of such a case.

From my clinical experience with the disease the following remarks may not be amiss.

When one has had considerable experience with any particular disease, he learns to know it as he would recognize a well known person—not by a deliberate consideration of its individual characteristics, but by intuition, as it were. So I found myself instinctively searching for a common symptom—a distinguishing feature—in all these cases. This was a *marked weakness* of the patient from the very onset of the disease. The cases varied greatly as to the severity of the infection, but this *languor* was common to them all. It is not noticeable in those suffering from malarial infection from which the surgeon is most often required to differentiate the disease in question. Nor is it necessary for this to be elicited by questioning. It is apparent to the examiner. It is seen in the *facies* and noticed in the actions of the patient. For example, a soldier reports sick. He has walked to the hospi-

tal, states that he has had a chill, says he feels sick at his stomach, remains standing and after his temperature has been taken and recorded as 104° Fahrenheit, requests to be permitted to return to his quarters to make secure his effects prior to admission. Such a case is not to be considered for one moment as a case of yellow fever. Another soldier has with difficulty been persuaded by a non-commissioned officer to report sick to the surgeon. He complains of slight pains in the back and legs and of headache. He appears distressed. His eyes are injected, he requests to be permitted to sit down and asks the non-commissioned officer to please secure his effects for him. His temperature is only 100° Fahrenheit. Such a case is extremely suspicious in yellow fever localities. Yellow fever patients desire to take to bed at once. This *weakness*, the congested conjunctivæ, the epigastric tenderness and the pains in the legs, seemed to me the earliest symptoms of consequence in diagnosing the disease among the fever cases of the tropics. Later on, the albuminuria, the bleeding gums, and the difference in the pulse-temperature ratio were almost pathognomonic. Vomiting may be entirely absent in the mild cases, although the patient will refuse all food. Later on, the jaundice and the hemorrhages confirm the diagnosis. The sore throat, spoken of by Osler as a symptom of the first stage, has not been present in any of my cases. The microscopic examination of the blood cannot be considered positive in differentiating this disease from the pernicious and remittent fevers of the tropics, because of the liability of mixed infection. I saw one such case at Santa Clara in a so-called "repeater" i. e., a person who is subject to recurring attacks of malarial fever.

#### GENERAL HEALTH CONDITIONS.

Cuba has entered upon a new era of health conditions. So long restrained and crippled by her past well-established and well-deserved reputation as one of the most dangerous and unhealthful localities on the face of the earth, it is now eminently fit and proper that the greatest publicity be given to the facts relative to the new health conditions which ob-

tain, and which have resulted from the American occupation and control. The happiness of health is essential to make perfect even the blessings of liberty. To have rescued this people from political bondage and then left them stifled in a pest-hole, for Cuba was virtually such, would have been as inadequate and unfortunate as it would have been unwise and unjust.

To-day, were it not for a few insanitary conditions which are inseparably connected with the character of construction of the living abodes in the cities, or of the unfortunately located cities themselves,—evils which are almost irremediable because rooted in the very form and growth of the country,—I would not hesitate to proclaim for Cuba, a sanitary status equal to that of any other country of the world. A great deal has been accomplished. The streets of the cities have been graded, paved and kept clean. This one improvement of itself is doubtless accountable for much good. Some of our own cities and towns could profit greatly from sanitary lessons learned in Cuba. House to house inspections have brought to light insanitary conditions within doors and these have in great measure been corrected or vastly improved. Due to the corral rock formation, underground sewerage systems have been impracticable in places. Under such circumstances other methods of sewage disposal have been introduced,—such as the odorless excavator system, the closed can system, etc. The compulsory reporting of contagious, infectious, diseases and the enforcement of the proper measures to prevent their spread and to destroy their infection have done much to reduce the mortality. The prophylactic measures used against the mosquitoes, and the diseases which these dipterous insects are now known to disseminate, have been most important.

Some idea of the results attained can be got from a glance at the following figures, taken from the health reports of Matanzas. In 1898 the total number of deaths from all causes was (April to January) 4252; for 1899, 975; for 1900, 624; for 1901, 617.

The most important diseases deserve special remarks. In Matanzas, as elsewhere on the island, the cases of yellow fever have been for the most part traceable to Havana, and when Major Gorgas announced that he had wiped out the infection from that focus, he sounded the death knell of the disease for the rest of the island. The methods of preventing its spread, as suggested by the findings of the yellow fever commission, have proved eminently satisfactory and certain.

#### TUBERCULOSIS.

The "Great White Plague" has a firm foothold in the cities, which makes it king of diseases, so far as my observations and information have led me to believe. To it are directly attributable about 20% of the monthly mortality and perhaps about 3% more of the fatal cases are in reality due to this cause, although they are classified under other headings, such as bronchitis, pneumonia, enteritis, meningitis, and scrofula. If this one preventable disease could be held in check, the monthly death rate, now averaging 17 per 1000, would be so reduced as to justify for that portion of the island at least, the title of a health resort.

Col. Havard, while chief surgeon of the Department of Cuba, began a crusade against this disease by encouraging the organization of chapters of the Anti-tuberculosis League throughout the island, and it is believed that this will cause an awakening of the native physicians and through them of the people in general to a full realization of the importance of disseminating information as to the contagious nature of the disease, and the consequent measures looking to its prevention. There are many obstacles to a successful effort against tuberculosis in Cuba, as elsewhere. Chief among these are the dark and damp houses which harbor it and the habit, so common, among the lower classes, of expectorating on the floors.

Next in importance to tuberculosis are the acute intestinal diseases. Because of the lack of uniformity and scientific exactness of diagnosis, there is considerable doubt as to the true nature of the several diseases reported under this head-

ing. The health statistics show such causes as diarrhœa, fiebre-enteroseptica, fiebre-infecciosa, enteritis, etc. Acute tropical (amœbic) dysentery is the most important and fatal disease in this category; although it is believed that tuberculous enteritis, enteric fever, and diseases due to intestinal parasites are responsible for a certain proportion of the cases.

Diseases of the circulatory system have been prominent as a factor in the death rates. Valvular disease and arteriosclerosis, with their resultant cerebral hemorrhages, figure frequently in the civil hospital reports.

Tetanus, both traumatic and infantile, is exceedingly common and fatal. One of the most general and firmly rooted superstitions among the ignorant classes is that lockjaw results from exposure to the light of the full moon.

Malarial fever is always more or less prevalent. I failed, however, to meet with the frequent pernicious and fatal forms so commonly attributed to the tropics, although I saw several cases with symptomatic hæmo-globinuria.

Acute follicular tonsillitis has seemed to me the commonest ailment in Cuba. It is often diagnosed as diphtheria by the native physicians, who then reap the rewards of a speedy and complete cure.

As would be expected, both muscular and articular rheumatism are frequently seen.

In my opinion cancer is not less frequent in the tropics than here at home.

Ankylostomiasis or uncinariasis, the common cause of anemia in Porto Rico, has not been seen by me in the part of Cuba where I have been stationed. Filariasis is not uncommon. Lumbricoid worms are the commonest of the intestinal parasites.

Dhobie itch and ringworm of the scalp are widespread. Mumps and scarlet fever are often seen. Typhoid fever is not so rife as in the States and I have been told by the local doctors that it has increased in prevalence since the advent of the American troops. I believe there is much truth in this statement because most of the cases which came under my

treatment were soldiers who had recently arrived from the North and, as a rule, recruits. The evidence of the last few years seems to point more and more conclusively to the common house fly as a chief agent in the spread of enteric fever in the tropics and elsewhere. The following facts relative to the sanitary condition of a seacoast town bear upon this point.

Two large streams become subterranean not far distant from Cardenas and form an underground current varying from 10 to 30 feet beneath the surface. Five-sixths of the dwellings are supplied with drinking water from this common substratum, furnishing as it does, in addition, the convenient function of a natural water-carriage sewage system for the city. Holes are bored through the rock for the necessary connections either for water supply or waste disposal.

Nevertheless, the number of deaths from typhoid fever in 1901 under such conditions was only 8 out of a population of over 24,000 inhabitants.

#### CONCLUSIONS.

In conclusion, the following statements are deduced from results of tropical service.

1. The great dangers to health so long ascribed to the tropics have failed to prove so dreadful when actually tried under favorable conditions and with the help of modern sanitary science.

2. Even the strongest constitution will feel the effects of tropical service after about two years of residence.

3. Those with existing cardiac or pulmonary affections should not attempt to combat the physical vicissitudes of the tropics under any circumstances.

4. Those predisposed to tuberculosis should avoid the cities on account of the widespread place infection.

5. The drinking of boiled water and the protection from the bites of mosquitoes are the most important measures of personal prophylaxis.

## Reprints and Translations.

### THE MILITARY MEDICAL JOURNALS OF SPAIN FOR 1902.

BY LIEUTENANT CHARLES NORTON BARNEY,  
MEDICAL DEPARTMENT, UNITED STATES ARMY.

*REVISTA DE SANIDAD MILITAR, (Continued).*

**T**HE WOUNDED IN THE EXPLOSION OF THE CARABANCHEL POWDER MAGAZINE. J. Huertas.—A clinical report of two cases.

The first, a sergeant of artillery, was struck on the head by a flying rock, which produced a contused wound 5 cm. in length and of irregular form in the left parietal region, involving the whole thickness of the scalp. Prolonged unconsciousness, aphasia, loss of tactile sensibility, complete muscular relaxation, contraction of the pupil of the right eye, the formation of a clot the size of a hen's egg over the left eye, frequent vomiting of partly liquid, partly clotted blood, and incontinence of urine and of feces, made the diagnosis of fracture of the base of the skull seem probable; but complete recovery in three weeks shows the case to have been merely an instance of cerebral contusion.

The second case was that of a peasant, struck in the face and both legs by flying rocks. The wound in the face extended from the left eye through the bridge of the nose to the right side of the mouth, leaving uncovered the nasal spine of the frontal bone, the nasal bones, the ethmoid, vomer and superior maxilla. The palatine arch was completely fractured. Nearly all the bones of the face were comminuted. The whole central portion of the face was moved over to the left. The right cornea was lacerated and the aqueous and vitreous hu-



mors of the right eye had escaped. There was compound comminuted fracture of both bones of the right leg; complicated by laceration of the anterior and posterior tibial arteries and infiltration of the soft tissues with blood. There was compound comminuted fracture of the left astragalus, os calcis, and lower third of tibia and fibula.

Loose fragments were removed from the wounds, the wounds cleaned, and antiseptic dressings applied. A portion of the face wound was sewn up. Splints were applied to both legs, and means adopted for continuous irrigation of the leg wounds. The patient was isolated in a darkened room, put upon milk diet, and received injections of artificial serum at regular intervals.

At first he showed enormous recuperative powers. He rallied well from the shock, which was extreme. The first day after the injury he remained without fever. In view of the increasing improvement in the patient's general condition it was thought advisable to wait another day at least before amputating the right leg.

On the second day there was slight febrile reaction and some nervous excitation. It was agreed to put off amputation until the patient should be in better condition.

By the 5th day the nervous excitation had disappeared. Temperature was 38.7°C. Pulse, 112. The face wounds looked well. Fragments of the comminuted bone began to be thrown off. Fragments were thrown off from the wound of the right leg also, and a large part of the Achilles tendon came away.

On the 7th day the wounds of the face and of the left leg looked well, but amputation of the right leg was determined upon on account of gangrene.

On the 8th day amputation was performed through the middle of the right thigh.

10th day.—Fragments still being thrown off from the wounds of the face and left ankle. Temperature 39°. Diarrhoea. Dressings of amputation stump dry,

12th day.—Wounds of face and left leg aseptic, and the

former filling up with granulations. Dressings removed from amputation stump and operation wound found dry but atonic. Temperature, 38.6°, pulse, 120.

14th day.—Wound of face healing. Septic focus in left ankle. Stump of right leg atonic, but with neither exudation nor odor. No more diarrhœa. Temperature and pulse same as before. Stitches removed, stump rubbed with oil of turpentine, depths of operation wound packed with gauze.

17th day.—Temperature and pulse slightly lower. Wound of face healing. Amputation stump in same condition as before,—dry but atonic, showing no signs of healing. Necrosis of left tarsus progressing, foot mummified. Patient showing much weakness.

20th day.—Amputation through upper third of left leg. Existing arteriosclerosis, the now unfavorable general condition of the patient, and the atonic condition of the stump of the right thigh had all been considered.

21st day.—General condition same as during the last week. Injections of artificial serum continued.

22nd day.—Diarrhœa. General weakness increasing.

24th day.—Wound of face partially healed. Amputation stumps apparently aseptic, but showing no signs of healing. Oil of turpentine applied to them.

28th day.—Temperature now normal. Diarrhœa has disappeared. Adynamia increasing. Patient continuously drowsy.

29th day.—Sudden rise of temperature to 40° at 10.00 o'clock at night. Normal again at 6 in the morning.

32nd day.—Temperature 39.7°, pulse, 120. Stupor becoming more and more profound. The stump of the left leg atonic and aseptic; the stump of the right thigh covered with a layer of mortified tissue, flaccid, cold, lifeless.

36th day.—Profound adynamia. Death.

At the autopsy general arteriosclerosis was found to be extreme.

STUDY OF THE FRACTURES PRODUCED BY SMALL ARMS PROJECTILES. This is the title of the "feuilleton" which ac-

companies the issues from January to October. It is an excellent monograph written by senior students of the Medico-Military Academy at Madrid under the direction of D. Miguel Slocker de la Pola, Professor of Military Surgery. It is too long for abstracting and it will probably be published in English at a later date.

*LA MEDICINA MILITAR ESPAÑOLA.*

*La Medicina Militar Española y Revista de Clínica y de Terapéutica y Farmacia,* like the "*Revista de Sanidad Militar,*" is published semi-monthly at Madrid in an octavo 6½ by 9¼ inches, but the individual numbers average 17 instead of 20 pages. It is edited by Dr. Angel de Larra y Cerezo, Major-Surgeon of the Sanitary Corps of the Spanish Army, a man of distinguished prominence in the medical profession of Spain.

The 24 numbers issued in 1902 comprise 412 pages. 47 pages (11%) are devoted to original articles on medico-military subjects, 8 in number, as follows: "Note on Vaccination," "Compressed Medicines and their Utility in Field Service," "Factors Which Ought to be Considered in Attempting to Estimate Numerically the Physical Value of the Soldier," "Military Sanatoria for the Tuberculous," "The Workings of the Sanitary Service on the Battlefield," "Experiments on Cadavers as Tests of the Effects of Firearms," "Medical Teaching and the Sanitary Corps," "The Great Hygienic and Social Problems in Relation to Armies." 47 pages also are devoted to 10 original articles on non-military subjects, such as: "Micrographic Analysis of the Tineas," "A Case of Ludwig's Angina," "Ovariectomy in a Case of Ovarian Cyst," "General Anæsthesia by the Bromide and by the Chloride of Ethyl." 8 pages (2%) are devoted to abstracts bearing on military medicine; 15 pages (3.5%) to abstracts on subjects medical but not military; 50 pages (12%) to original articles on purely pharmaceutical subjects; and the remaining 245 pages (nearly 60%) to book reviews, obituaries, official orders, changes of station of the medical and pharmaceutical personnel, etc.

Following are abstracts of all the original articles on medico-military subjects.

**NOTE ON VACCINATION.** Virgilio Hernando.—As far as prophylaxis against small-pox is concerned, military hygiene, by the methodical employment of vaccination, has reached perfection. Even at such military posts as are situated in the midst of civil populations which constitute endemic foci, small-pox has been practically eliminated from the list of diseases.

The author believes that, in addition to natural and acquired immunity and the slight influence of local climatic conditions, the percentage of successful results after vaccination depends on the amount of virus inoculated.

He vaccinated from the same tube of lymph twenty soldiers who had never before been vaccinated. In the first 10 he limited the quantity of virus inoculated to that which was carried in by the point of the scarificator, and in the second 10 he scarified as before, but also placed upon the scarified surface an additional drop of virus sufficient to fill all the minute fissures. Of the first 10 vaccinations only 3 "took," while 7 of the second 10 were successful. At a later date the 7 unsuccessful cases of the first group and the 3 of the second group were revaccinated with the same lymph and by the same method which had been used in the second group; the 7 of the first group all developed vaccinia while the 3 of the second group still remained unaffected.

**COMPRESSED MEDICINES AND THEIR UTILITY IN FIELD SERVICE.** Isidro García Julián enumerates the, to us well known, advantages of compressed tablets. It would appear that these are not well known in the Spanish Army, and that the only medicinal tablets furnished Spanish medical officers are tablets of antipyrin, 'rhubarb, sodium bicarbonate, and bichloride of mercury, recently adopted. The author mentions having used morphine hypodermic tablets from his own private stock during the war in Cuba and describes how he dissolved them in a teaspoon heated over a candle. He further states "Medicines are used in tablet form in the sanitary

services of the German and Russian armies; and in the army and navy of the United States also, as I had an opportunity of observing while I was a prisoner of war aboard the gunboats 'Nashville' and 'Maple' and at Fort McPherson. In the French army tests are now being made to determine the utility of compressed tablets, and the test will no doubt result in the adoption of the tablets."

FACTORS WHICH OUGHT TO BE TAKEN INTO ACCOUNT IN ATTEMPTING TO ESTIMATE NUMERICALLY THE PHYSICAL VALUE OF THE SOLDIER. Federico G. Deleito.—In a previous article on this subject the author contended that the day had not yet arrived when the physical value of recruits or their resistance to disease could be indicated by figures obtained through a mixture of measurements expressed in centimeters and in kilograms. In further proof of his contention he points out in this article how the liability and immunity of recruits to certain diseases is affected by the locality from which these recruits come, and by the locality, and even the arm of the service, to which they are sent.

"While I was stationed at Pamplona I noticed that an overwhelming majority of the soldiers discharged on account of tuberculosis were men from Santander, the district which supplies recruits for one of the army corps represented in the Pamplona garrison, while very few came from Soria, the district which supplies the other corps there represented. The conditions under which these two groups of soldiers lived in garrison were exactly alike. Both were infantry, both were quartered in barracks which were most detestable from every point of view, both had the same duties. By looking at a map which shows the prevalence of tuberculosis in Spain, or reading the monthly mortality reports of the various provincial capitals, one sees that Santander contributes in greatest degree to the white plague, and Soria least."

Much the same thing happens with typhoid fever. But here the differences in morbidity and mortality depend not so much upon the province or region from which the recruits come as upon the kind of life, whether rural or urban, which

they have led. Typhoid is much more easily acquired by those who have lived isolated lives in the open country than by those who, habituated to life in cities, have acquired a certain degree of immunity.

**MILITARY SANATORIA FOR THE TUBERCULOUS.** Jesús de Bartolomé y Relimpio strongly urges the institution of special sanatoria for the observation and treatment not only of those who develop tuberculosis after entrance into the army, but also of those who at the physical examinations to determine fitness for service are suspected of having the disease in an incipient stage. This he believes to be the only radical, and at the same time humane, means of reducing the frightful and increasing mortality from tuberculosis in the Spanish army.

Under existing laws in Spain no one can be exempted from military service on account of suspected tuberculosis. The existence of the disease must be definitely proven. And as the diagnosis cannot often be made in the earliest stages very many recruits are taken into the ranks suffering from incipient tuberculosis. This develops under the notoriously bad hygienic conditions of life in the great majority of Spanish barracks and gives rise to other cases of the disease, which in turn become distributing foci.

Of late years measures intended to improve the hygienic environment of the soldier have been prescribed in orders, but these measures have not been sufficient. Entirely new barracks should be built, and pending completion of the barracks the soldier should be instructed in the means of avoiding the disease. But this is not all. The radical measure needed is elimination of the tuberculous from the army. But for the safety of society it should be remembered that they still scatter the seeds of their disease about them wherever they are, whether in the army or out of it.

Even the exemption from service of those who are suspected of having incipient tuberculosis, together with the discharge of those who acquire or develop tuberculosis in the service, does nothing more than shift the infectious foci from

the military to the civil population. Suspected cases as well as developed cases should be isolated under observation and treatment in special tuberculosis sanatoria. The adoption of this plan would not only diminish the spread of the disease, but would give those suffering from it the very best chance of cure.

Since the first sanatorium was founded by Bremher in 1859, the establishment of special sanatoria has gone on at an increasingly rapid rate. Nearly all of the most civilized countries have public civil and military sanatoria for the tuberculous, but unfortunately for Spain she has not followed the lead of other nations in this direction.

(TO BE CONCLUDED.)

#### THE INFLUENCE OF POLITICS UPON MILITARY HYGIENE IN FRANCE.

THE *Lancet*, commenting upon French military sanitation, remarks that the effort to quarter troops in salubrious surroundings where there is a pure water-supply is often defeated by political influence. All towns seek to be made garrison towns, for the presence of officers and men is the cause of a wide-spread circulation of money. When it is proposed to withdraw a regiment from some notoriously insanitary town in which the municipality is unwilling to spend any money in securing a wholesome water-supply, it is almost impossible to do so on account of the protests of the town deputies, especially those belonging to the ministerial majority. It is not uncommon for a minister to reward a town which voted straight by sending it one or two regiments whose members will spend money in the town, and to punish another town by withdrawing the garrison. Some years ago, when the right of having a Faculty was transferred from the town of Douai to that of Lille, two engineer regiments were sent to Douai as compensation. It is hard to carry out hygienic measures when the minister has little resistance to the vested interests of electors.

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## Editorial Department.

### THE TWELFTH ANNUAL MEETING.

THE arrangements for the twelfth annual meeting of the Association at Boston on the 19th, 20th and 21st of May continue to develop most attractively. Large delegations of national guard medical officers have been made by the governors of many of the states; the national services of our own country will be amply represented; and notifications of delegates from the forces of foreign powers are rapidly arriving.

A number of important additions to the list of papers to be read at the meeting have been added to the program, among which may be mentioned the following:

1. A Mounted Bearer Company By *Lieut. Col. H. G. Hathaway*, R.A.M.C.
2. The United States Naval Medical School. By Medical Director *Robert A. Marmion*, U.S. Navy.
3. The Preservation of the Soldier's Health. By Brigade Surgeon-Lieutenant-Colonel *William Hill-Climo*, A.M.S. England.
4. The Instruction of the Hospital Corps in Companies and Detachments. By Captain *Frederick P. Reynolds*, U.S. Army.
5. The Acting Assistant Surgeon, U.S. Army. By Major *Azel Ames*, U.S.V.
6. Medical Treatment of Appendicitis in Accordance with Modern Views of Therapeutics. By Lieut. *Enrico Castelli*, Italian Delegate.
7. Yellow Fever at Las Animas Hospital—the Hospital of the Sanitary Department during the Epidemic of 1900 at Havana, Cuba. By Colonel *William C. Gorgas*, U.S. Army.
8. Quarantine as the Picket-Line, By Surgeon *Parker C. Kalloch*, P.H.&M.H.S.
9. Hysteria in the Male. By Surgeon *Sheldon G. Evans*, U.S. Navy.
10. A Note on the Surgical Experiences of the Boer War. By Surgeon-General *W. F. Stevenson*, A.M.S. England.
11. The Treatment of Dislocation of the Shoulder.—Report of a Case in which the Detached Greater Tuberosity prevented Reduction. By Assistant Surgeon General *George Tully Vaughan*, P.H.&M.H.S.

Boston is prepared to receive the Association with doors wide open. On her part, nothing will be omitted which can

make the meeting a most successful convention, and her display of hospitality promises to be so unstinted as long to be held in the memory of her guests.

#### GERMAN ASSOCIATIONS OF MILITARY SURGEONS.

A SERIES of papers upon the medico-military associations of various nations is appearing in *Le Caducée* from the pen of Major Laval, its distinguished managing editor. The series opened with a comprehensive paper upon the Association of Military Surgeons of the United States and follows with some remarks upon the similar organizations of Germany. There are twenty-one exclusively medico-military societies in the German empire, each of which holds a monthly meeting at the headquarters of the army corps with which its members are on duty. The Berliner Militärärztliche Gesellschaft,—the Military Medical Society of Berlin,—comprises 161 officers of the medical departments of the four army corps serving in and about that city. All officers in active service are required to attend the meetings of these societies, however far they may be located from the place of meeting. At each meeting the work includes papers, discussions and scientific demonstrations. The officers are a chairman who presides at the meetings and a secretary who arranges the program and prepares the report of the transactions.

The proceedings of the Berlin society, as well as of the other similar associations of Coblenz, Cologne, Trier, Bonn, Saarbrücken, Aachen, etc., are published monthly in the *Deutsche Militäerärztliche Zeitschrift*.

Major Laval remarks that the German societies are quite opposite in character to that of the United States. In America military surgeons are entirely free to join their association or not; in Germany each officer is required to be present at the meetings at whatever cost of time and travel. In America there is but a single meeting a year, which however is "immense" and lasts for several days; in Germany there are frequent, generally monthly meetings, at the various military centers. The Association of Military Surgeons of the United States displays clearly marked international tendencies; the German societies absolutely exclude foreign elements.

## Reviews of Books.

### THE ADRENAL THEORIES OF SAJOUS.\*

“**T**HE Internal Secretions and the Principles of Medicine” commands the attention of the profession because of the recognized ability of its distinguished author. A like work by an unknown writer would have been deluged with the criticism and anadversions of the reviewers of the medical press. The production of such an eminent physician as Sajous cannot be thus treated. Yet the columns of our esteemed contemporaries as yet have contained no intelligent, detailed criticism of the revolutionary theories so boldly advanced by our author. The medical press, with unimportant exceptions notice the work with an absolute lack of discussion concerning its truth. The reviewers content themselves with statements describing the contents of Sajous work, and they use the expletives “bold and new” in conjunction with our author’s statements. The truth is that the reviewers, as the profession at large, do not know whether the book before us is of tremendous importance or of utter futility. There are few among us with sufficient data to back arguments for or against the theories advanced by Sajous. Our author has been working in a field of whose existence we knew, whose confines we speculated upon and whose possibilities were almost unknown to us. The result of the labors of Sajous come then from the fields of experiment and until the profession has for itself explored these fields and verified the work of this investigator of adrenal phenomena it must regard with respectful consideration what it cannot intelligently discuss,

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\*“The Internal Secretions and the Principles of Medicine.” By CHARLES E. DE M. SAJOUS, M.D. etc. In two volumes. Volume I. Octavo 788 Pages. Illustrated. F. A. Davis Co., Philadelphia, 1903.

let alone disprove. We are fully aware that it will be but a short time before controversy will rage upon the points raised by Sajous, but it will be years before this controversy, save in isolated cases, will be based upon fact. It is well then, at this early period, to prepare ourselves to disregard the wordy warfare and join those to whom silence will be golden, until research can give legitimate basis to controversy.

This brief statement of the knowledge of the profession concerning the subject of Sajous work and the reason for the lack of present and immediate future intelligent criticism upon it will serve to introduce a sketch of the contents of the first volume of "The Internal Secretions."

In Sajous's research his first endeavor was to ascertain "whether the physiological functions of the adrenals were sufficiently similar in all vertebrates to warrant the use of experimental data obtained with lower animals in the study of these organs in man." Sajous asserts that such is the fact. Proceeding from this fundamental premise, which for the sake of argumentative form we accept, our author advances a series of theses that are destructive of accepted beliefs and if maintained are of the greatest importance to medical science. The average practitioner will be surprised by such statements as: "The adrenals are the key not only to tissue-respiration but also to the functions of all other organs now classed as 'ductless glands' and destined to fulfill the mandates of the latter." He will question the assertion that the secretion of the adrenals at the pulmonary alveoli, the point to which the observer traced the secretions "hold in combination the various constituents—of hæmoglobin, and endow both the latter and the plasma with their affinity for oxygen." Nevertheless these statements will, if they stand, change our present theory of the chemistry of respiration and of the structural pigmentation of blood. The series of conclusions has no more striking member than the statement that the red corpuscles are not the only carriers of oxygen but that the blood-plasma plays an important part in the distribution of the gas. "Indeed" says our author "we subsequently ascertained that the red corpuscles were secondary factors in this important function, i. e., mere carriers, pack-mules, as it were,

and that it was the oxygen-laden adrenal secretion dissolved in the plasma itself which carried on all the oxidation processes of the organism."

Sajous has given a most luminous exposition of his theory of the adrenoxinal movement, his statements concerning physiological chemistry of cellular elements are particularly informing although we are not, as yet, prepared to follow him in his conclusions concerning the functions of axis-cylinders, dendritis of neurons and the neuroglia-fibrils as plasma bearing channels. Let our position here be fully understood, we cannot now follow, where presently we may, simply because our research has not as yet convinced us of the possibility of the passage of the adrenoxinal elements through all the structures specified by Sajous. Passing our author's conclusions, in verification of physical phenomena, and his assumption that the "immanent source of functional energy" is myelin and that the entire nervous system is built up of cylinders containing adrenoxin surrounded by a layer of myelin and that the reaction between the two bodies served to form and liberate energy; we come to a cardinal point of our author's work that the anterior pituitary body, hitherto regarded as practically functionless, is the most important organ of the body, is in fact the governing center of the adrenals, and, therefore, of all oxidation processes. The importance of such a fact when established in the pathogenesis and treatment of disease is incalculable. Sajous in satisfactory detail discusses cause and effect and by specific instances seems to furnish abundant proof of his theory of the functions of the anterior pituitary body.

Sajous, continuing his delineation of purpose, states that "the physiological purpose of the thyroid gland is to sustain the functional efficiency of the anterior pituitary body up to a certain standard by means of its secretion; iodine in organic combination. Excessive production of this secretion, by causing overstimulation of the anterior pituitary body, gave rise, when prolonged, to 'exophthalmic goiter;' while reduced production of thyroid secretion, by inhibiting the functions of the anterior pituitary body, caused myxœdema. The thyroid gland, the anterior pituitary body, and the adrenals were

thus found to be functionally united: i. e., to form an autonomous system, which we termed the 'adrenal system.'" The posterior pituitary body is stated by Sajous to be second only in importance to "its mate the anterior pituitary body." In fact to be "the chief functional center of the nervous system, its numerous groups of neurons forming the starting point, or highly specialized center, of a single class of nerves." The posterior pituitary body "is an important feature of the morbid process in influenza, hay fever, hysteria, catalepsy and other obscure affections."

Our author next discusses the functions of the pancreas and the spleen and his conclusions are of intense interest.

In conclusion he sums up the result of his inquiry as follows: "Briefly, our inquiry seems to us to have shown that the adrenal system is the source of the secretion which, with the oxygen of the air, forms the oxidizing substance of the blood-plasma. It has also revealed, we believe, the origin and mode of distribution of the bodies with which this oxygen directly or indirectly combines; i. e., peptones, myosinogen, fibrinogen, hæmoglobin, and myelin, to insure the continuation of life and the efficiency of all organic functions. Finally, it has suggested that in addition to these agencies, all leucocytes and, under certain circumstances, the plasma, contain a protective agency, trypsin, which, with Metchnikoff's phagocytic cells, serves to destroy micro-organisms and convert their toxins and other albuminoid poisons into harmless products. Considered jointly, these various factors seem to us to represent the aggregate of vital phenomena."

But to many physicians the most important part of our author's work deals with "Immunizing Medication"—"the use of remedies to arrest diseases during their incipency by stimulating the functional activity of the adrenal system." Particularly vital to the practitioner are Sajous statements concerning epidemics, injuries received in places thought to contain *tetanus saprophytes*, after bites of presumably rabid or venomous animals or after infections; his assumption that vulnerability to tuberculosis is congenital adrenal insufficiency and his theories concerning the prevention of death in acute diseases.

To conclude we summarize the contents of the work before us by quoting the chapter headings—These are I. "The Physiology of the Adrenals as Viewed from the Standpoint of Clinical Pathology." II. "The Internal Secretion of the Adrenals in its Relations to the Respiratory Processes and the Composition of the Blood." III. "The Internal Secretion of the Adrenals to the General Oxidation Processes." IV. "The Internal Secretion of the Thyroid and Thymus Glands in Their Relations to the Adrenals." V. "The Anterior Pituitary Body, the Thyroid Gland, and the Adrenals as Parts of an Autonomous System." VI. "The Adrenal System and Vasomotor Functions." VII. "The Adrenal System, the General Motor System, and the Pneumogastric Nerve." VIII. "The Internal Secretion of the Pancreas and Spleen." IX. "The Adrenal and Vagal Systems in Their Relations to Cardiac and Pulmonary Functions." X. "The Posterior Pituitary as the Functional Center of the Nervous System, and as the Anterior Pituitary's Co-Center in Sustaining the Vital Processes." XI. "The Internal Secretions in Their Relations to Immunity." XII. "The Internal Secretion and the Preservation of Life."

We desire to express our appreciation of the modesty with which our author submits his work to the profession. He does not claim absolute infallibility. He becomingly awaits the verdict of contemporary scientists but he firmly and properly maintains his conclusions. We have followed his arguments with care and in a few instances, our personal research has furnished corroboration of the statements made by our author, but in other instances the opposite result has accrued, and on these we defer judgment until we have verified our tests. In the main, however, we may state that we are not prepared, at present to accept the conclusions of our esteemed author though we give to him full credit for his great and laborious research, his brilliant and important conclusions. We trust though for Sajous' reputation and for the great benefit that must accrue to the science of medicine if his theories are correct, that the future may see a substantiation of the statements so well postulated and convincingly discussed in the book before us. HILDEGARDE H. LANGSDORF.



## THE MILITARY MEDICAL OFFICER AT THE OPENING OF THE TWENTIETH CENTURY.\*

By DR. JOHN S. BILLINGS, LL.D., D.C.L.,

LIEUTENANT COLONEL IN THE UNITED STATES ARMY, RETIRED;  
DIRECTOR OF THE NEW YORK PUBLIC LIBRARY.

I SUPPOSE that it is entirely within the bounds of possibility that some forty or fifty years hence some member of this class will come back here to give the address to the graduating class of that date. I am not specially curious as to which one of you gentlemen will perform that duty,—but I should very much like to know what he will say—if I did, I could probably make a very interesting address myself, although I might have to make a very careful selection for fear of being thought a crank. I can hardly imagine what Dr. McLaren, the President of the Army Medical Board which examined me, would have thought if I had tried to answer some of his questions as you would probably answer them. He thought that great progress had been made since he entered the service at the beginning of the Florida War, and that we young fellows were going into the War of the Rebellion with great advantages. He had seen the introduction of anesthesia, and was enthusiastic over the comparatively new operations for excision of joints. He had just heard of the clinical thermometer, but doubted whether it would be of much use, and had also heard of the hypodermic syringe; and when he found I had one of these instruments, he went to Surgeon General Finley (this was in 1861,) and had me assigned to duty at the hospital under his charge so that he might see how these new things actually worked. If, however, in answering his question as to the means of preventing malaria and typhoid fevers among troops, I had referred to bacilli, haematozoa, flies and mosquitoes, as you would probably do, I don't think I should have passed,

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\*Address to the graduating class of the Army Medical School at Washington, April 14, 1903.

and if I had referred to antitoxin as a means of treating malignant sore throat (his name for diphtheria), he would have advised me to take a six months' rest in an asylum. I was asked to describe laudable pus and the best means of securing healing by the second intention. Have any of you ever seen any laudable pus? Certainly my knowledge of medicine in those days before you were born was not great as compared with yours, but when I went to the army of the Potomac I found a few doctors who knew less, as appeared from the results of a certain examining board of which I was a member.

When the war was over and the armies of Grant and Sherman had made their last parade, when, thirty-eight years ago to-day, President Lincoln was assassinated, and at last rested in the peace of death, and the old Ford's Theatre was occupied by the Army Medical Museum and Library, the younger medical officers in the museum became busy with investigations, and it is interesting to remember some of the problems which occupied them. One was the comparison of high power microscopic objectives as tested on Nobert's lines; another was the best way of making photo-micrographs; a third was the best method of staining and mounting tissues. I clearly recollect the feelings of triumph with which I took some slides of stained sections of kidney and intestines mounted in balsam to Dr. Woodward, who had been very incredulous as to the possibility of making such preparations. Then Dr. Edward Curtis and myself began the study of minute fungi and of Texas cattle fever, looked for the malarial organisms on Analostan Island, and spent much time on bacteria, following Pasteur's method. In the absence of the solid isolating culture methods devised by Koch, we were groping blindly, but I have not regretted the time spent in this groping. It is impossible for you to appreciate the feelings with which we read Koch's first papers, or with which we viewed the commencement and progress of antiseptic surgery.

When I graduated in medicine I had to write a thesis, and for divers and sundry reasons, I chose to write on the surgical treatment of epilepsy. I undertook to get the history of all reported cases of such treatment, and in trying to do that I discov-

ered that there was no library in the United States which contained all the reports. There were no complete files of medical journals in this country, and any man who really wanted to write a scholarly book on medicine had to go to London or Paris for his data. It seemed that that condition of things should be improved, and when I came here in the Surgeon General's Office and was detailed to settling the medical accounts of the war, I put in some side time in trying to get this library together.

The work which was done in the old Ford's Theatre in the latter sixties and the seventies, in connection with the Museum and Library was in part merely incidental to the preparation of medical and surgical history of the war, in part for the advancement of medicine, and in part for the pleasure of the young men engaged in it. Its direct results on the science and art of medicine were not great, but its indirect results have been and are important. This Army Medical Museum and Library are well known to physicians all over the world, and the opportunities they have afforded and the aid which they have given to physicians in the United States have been such as to produce in the medical profession a strong interest in the Army Medical Department. It is desirable for all parties that this interest should be maintained, and to this end the younger members of the Medical Corps should know and feel that this Army Medical Museum and Library is an inheritance to be cared for and increased by them for their own and the general good. One of the good things about this Army Medical School is that it brings the Assistant Surgeons in touch with this institution, giving it some of the features of a central home club.

Thirty years ago there were considerable difficulties in obtaining funds for this Institution. I look back at my experience with Congressional appropriation committees with more amusement than I felt at the time. At present I am told that the difficulty is to obtain the funds required to provide shelving for the books, rather than to obtain the books. This is also amusing.

When I asked for suggestions as to what I should talk to you about, I was told:—"Oh, the usual thing, congratulations and advice."

As for my congratulations,—you have them,—and they are sincere. It is really a very fine thing to be a young army medic-officer, although there are, occasionally, short periods of time when he may not think so: He may have some doubts about it after he has been for a year at some small, isolated, very healthy post, or, for a month before his examination for promotion, or when he has to decide without advice as to what he will do for his first case of strangulated hernia, or of incipient melancholia, or of shot-wound of the abdomen, or of locked twins. He may even more than doubt it when he takes a stereoscopic view of his contemplated marriage on the one side and his salary and prospects on the other. These doubts will pass, but as a rule he will not know clearly what a good time he is having and what a fortunate man he is until he looks back over his career across the gulf of twenty or thirty years.

If it is true, and I think it is, that "a spice of danger and an element of chance add interest to work," then your work will have that interest. You are not coming on the stage of action at the beginning of a period of peace and content, but in the midst of a waxing tide of national struggles for commercial supremacy and of discontent among great masses of people. "That this turmoil and unrest can be dealt with wisely and justly, so as to preserve that which is most desirable in civilization and in our system of representative government, I believe, but here and there in special localities, the immediate problems must probably be solved by blood and steel, and that you will have a part to play in some of these is not at all unlikely."

You will have some epidemics to face, and no doubt some of you will have a chance to hear bullets whistle, arbitration to the contrary notwithstanding, but the increased interest which these things may give to an army surgeon's life is too uncertain and temporary to be worth consideration. The things most to be dreaded in your future lives are boredom and waiting, and the preventive and remedy is to see to it that you have something to do always,—and doing it. It may be, generally must be, routine, like a woman's knitting work; sketching or photography, Indian languages or calculus, infusoria or ascomycetes will any of them

keep you busy. But suggesting subjects for work is a little like the plan of the man who told James Russell Lowell that he had discovered the way to make a fortune. "As the fine flavor of the canvass-back is due to the wild celery on which it feeds, I am going to feed tame ducks with it and supply the market." Some weeks later Lowell met him and asked him how the duck feeding plan was getting on. "Well," was the answer, "they wouldn't eat it."

Forty years ago the microscope was mainly used by physicians as a plaything, a source of occasional amusement. It was the correct thing for the young graduate to buy a thirty dollar Oberhauser, and keep it in a conspicuous place in his office, but his chief use of it was to show his admiring friends the terrible monsters contained in a drop of selected water.

To-day the microscope is one of our most important tools, and you have been taught how to use it, but it may be well to remind you that you can get a great deal of pleasure by using it in research work not directly connected with medicine.

When you obtained your diploma as Doctor of Medicine, it is possible that many of you thought you knew it all, or nearly all, and that what you did not know could be found in the latest text books, monographs and journals. Probably all of you are now aware that there are many things in regard to the causes, prevention and treatment of disease which, at present, nobody knows; or if any one does know, he has not told. There is no end to the things we don't know and ought to know, and probably will know within your lifetime.

Some of you have, perhaps, resolved that you will investigate some of these unsettled questions, and may have even selected the particular problem which you intend to solve. This is good, very good, but remember that in your life as an army medical officer the subject for investigation will usually be determined by your opportunities rather than by your wishes. I advise every young army surgeon to have some research work on hand, for his own mental health and pleasure, just as I advise him to take a certain amount of physical exercise, and if he cannot make the particular research he would most like, that he try to like the

research he can make. Of course his selection of a subject for study will be largely involuntary; if he feels a strong impulse towards some special line of work, it is well for him to follow it, but if this work has no relation to his military duties he must bear in mind that these duties have precedence. The fact that he is an enthusiastic botanist, ornithologist, or comparative anatomist, is no reason whatever for his neglecting to keep himself well informed as to advances in medical science, or not being interested in his patients or in the sanitary condition of his post. It is also a very poor reason why he should try to obtain posts which are specially favorable to his particular hobby, if this hobby is not connected with military medicine. If he considers his research work more important than his army duties, he should resign from the latter.

What amount of time and energy should be given to original research work by professional men employed in college and university work and in Government departments is a question which has been much discussed of late years. The exceptional man, who knows all that is known on some one subject and has the capacity and the desire to increase knowledge on that subject, and for whom many of our Universities and large manufacturing and engineering establishments are seeking, is not easily found, and when found it is not more than an even chance that he can be trusted to fulfill the ordinary every day duties of his profession, including administrative work.

If any of you feel satisfied that you are that sort of man he had better communicate with the Carnegie Institution.

Most of us hold our professional work as the first and most important object, and original research as a thing to be done as opportunity offers. We belong to the second class mentioned in Hesiod, i. e., those who can understand things when explained to them.

I shall not attempt to advise you with regard to your special medical, sanitary or surgical work, but merely ask you to remember that every army medical officer has some special opportunities for increasing knowledge, but that to enable him to recognize these opportunities and to take advantage of them usually

requires long study and training. It was because of this study and training that your late teacher and friend Dr. Walter Reed, was able to recognize his opportunity and to make the discovery with regard to yellow fever which has placed his name high on the roll of the famous physicians who have been great benefactors to mankind. His work on this subject was not done under direction, rather in spite of it, yet the line of work in which he had been engaged for the previous ten years was what fitted him for the emergency.

These special opportunities always come to the physician, the naturalist, the anthropologist, they are connected with phenomena which are occasional—rarely just alike and must be secured at the time or be lost. But you must be able to recognize them if you are to use them. Remember the motto of the Washington City Directory "To find a name in this book you must know how to spell it."

Permit me to say a word about your social relations and duties, which are substantially those of the family practitioner, but with some special peculiarities. In time of war the surgeon is more intimately associated with line officers and their work than are the officers of other staff corps, and to a certain extent this is also true in time of peace, and as a general rule they are good friends. In my time there were two or three commanding officers who always had difficulties with medical officers, unless they were sick, but so they did with all other officers. There were also two or three medical officers who always had difficulties with their commanding officers, although they might be on very friendly terms with other officers. These gentlemen were sensitive on questions of rank, and rights, not so much on their own account (as they explained), as because they felt it to be their duty to uphold the dignity of the Medical Department. Now the nature of either personal or Departmental dignity, and the desire to have all of one's rights, is such that the more attention you give to them the more they seem to require, and it becomes hard to spare the time necessary to preserve them spotless and unfrayed.

Your military rank may, on rare occasions, be an important

matter in dealing with the rank and file, but your medical skill and tact are more important in the ordinary routine of army life.

It is your duty to contribute your quota towards the social life of your post, and to try to make it cheerful and interesting. Of course, your personal likes and dislikes, strength or weakness, in such matters as athletics and games, shooting and whist, reading clubs and amateur theatricals, the nieces of the Major's wife, and other sources of amusement, will have much influence on your actions,—but be ready to give some of your time to things you don't care much about, if it is for the general good and pleasure. You have got to take into consideration the opinions, feelings and desires of some women as well as the men, but the only piece of advice I can give on this point is,—whenever you find yourself thinking that you thoroughly understand the ladies,—or a lady,—at your post, you had better not prophesy.

You have also certain social duties in connection with the soldiers under your charge. You should know them by sight and name, and you should be interested in their individual peculiarities. And this should be a real interest,—the soldier is quick to detect perfunctory, patronizing forms of apparent interest. Why does Smith sulk or mope and get off by himself as much as possible? Why has Brown suddenly become quarrelsome? How is Jones the new recruit getting on? "These matters are the business of the line officers," you will say. They are, but they should also interest the medical officer, who, without impertinent inquisitiveness, and with tactful sympathy, can often make the rough path smooth, and help his brother officer to form a wise judgment.

The medical officer may also have social and professional duties in connection with civilians in the vicinity of his post. At a few special places his medical services are in much demand by civilians and are paid for, wherefore these places are desired by army surgeons. If there are other physicians in the vicinity, and there are few places where there are not, they may think that the army surgeon's work should be confined to the limits of his post, and professional jealousy with a little mixture of the Code of Ethics, has in bygone years, caused trouble to the medical officer.



On the other hand you will find that such jealousy is the exception and not the rule, and that if you sympathize with what interests your professional brethren, wherever you may be, you will receive cordial sympathy and aid from them. You are "members of a world-wide guild, the oldest one, and the only one." The medical officer has thus a double comradeship, and this is one of the specially attractive features of his position.

Your attendance at this Army Medical school will have other results besides increase of professional knowledge. You have become more or less acquainted with each other's personality, more than you could otherwise have done in many years, and I hope you have formed some friendships which will endure.

Probably you will never all come together again in this life, after you have taken your different routes over the iron lines that bind this country to its Capital, but your paths will cross each other many times and in unforeseen places. At each crossing may your memory of your Washington experience aid in making the meeting a happy one.

As members of a great profession, as officers of the nation, as citizens of a great country, as men possessing special knowledge and selected from many candidates, you are coming on the stage of action to share the burden and responsibility of the world's work, to bring fresh blood and energy into the organism, to maintain and add to the dignity and honor of your corps and of your country. Enter upon your heritage modestly, but confidently. Be strong and of good courage. "Nos morituri salutamus."



## THE OPPORTUNITIES OF THE YOUNG MEDICAL OFFICER OF THE ARMY.\*

BY THE HONORABLE ELIHU ROOT, LL.D.,

SECRETARY OF WAR OF THE UNITED STATES OF AMERICA.

THE formula to be applied to these occasions requires the officer delivering the diplomas to say something. It also requires that what he says shall be brief.

I am glad of the opportunity to say to you that I hope the address which has just been delivered, when it is printed, as it will be, will be preserved by each one of you, and that on the 14th of April every year during your connection with the Army you will read that address through from beginning to end and revive in your minds the wisdom enforced by the charming humor and sentiment with which Dr. Billings has favored you.

I will add to what he has said my congratulations to you on coming into a Corps which can produce such men as he; which has already a standard which you have to live up to and by which you can measure your own growth or decadence in intellectual and moral status.

About the only recognition that the Congress of the United States has given to the American Army for all the labors and struggles of the past five years is to be found in the signal honor conferred upon a member of the Medical Corps of the Army by the statute making Dr. Gorgas a Colonel as a recognition of his distinguished service. That same honor would have been conferred upon Dr. Reed had it not been for his untimely and lamented death.

It is due to the untiring effort and the trained intelligence of the Medical Corps, that the Army of the United States has the extraordinary distinction of having in Cuba saved more lives than

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\*Address upon conferring diplomas upon the graduating class of the Army Medical School at Washington, April 14, 1903.

it destroyed; so that the saving department of this great agent of destruction has overbalanced,—preponderated over the destructive element, and made a life-saving rather than a life-destroying Army.

I congratulate you upon your opportunities,—the opportunities of science secured to you by your position in the Army. I hope the opportunities are more to you than the rank and pay and allowances,—the opportunity to pursue your science, to develop yourselves, to accomplish something for mankind, for your country, for your profession, free from the restraints and difficulties that the necessity of bread and butter throws before almost every scientific man.

The opportunities of the Medical Corps of the Army are constantly widening. The policy which is now being pursued of taking care of the larger Army in larger posts instead of scattering it in small posts will greatly increase your opportunities for practice and, for research and for individual growth. The large posts where there will be the attrition among many men, association with your seniors and the opportunities that come from a great collection of men will take the place for you of those little one and two company posts in which the isolation and the lack of occupation and of opportunity led so many a promising young man to dwindle and dry up before he reached maturity.

Congress is continually broadening in its treatment of every scientific branch of the Army. It takes time and campaigns of education to secure the adoption of measures and the grants of money necessary for great steps in advance, but that kind of campaign is going on all the time, and I look with great confidence to see at an early date complete success following the efforts of your Chief, the Surgeon General, to secure ample endowments for a greater Army Medical School and more complete hospital facilities for the members of your Corps in the city of Washington.

So you are entering a Corps which is ennobled by past achievements and which has before it constantly broadening opportunities for good, opportunities to do great things for mankind and to make a mark in the history of your profession and history of the

Army. I congratulate you upon it. I hope that you will never allow the desire to be military men purely,—the desire to be soldiers as distinct from doctors overcome you. I would rather hear a surgeon called a "surgeon in charge of a hospital" than the "commanding officer of a hospital." I believe I have sometimes observed a tendency to sink the "Doctor" in the "Captain" or the "Colonel." I think that this is doing injustice to a noble profession, and that you will not become officers rather than remain doctors. You cannot climb any higher up in rank or in title than you are when you stand on the pedestal of the profession to which you gave your first loyalty, your first adherence. But as members of two noble professions, both of which have high standards of ethics and of ambition, you ought to have every capacity which you possess developed to the highest point and to have through life the happiness which comes not from making fortunes, not from holding great offices or wielding power, but which comes from well-employed, well-rounded and useful lives,—the happiness which comes from accomplishing things, from achievement, from results and from individual growth and individual worth attained by individual effort.

In the belief that you will do honor to this institution and to the Army of the United States, it is with greatest pleasure that I now hand you these diplomas.



## “THE IDEAL RELATION FOR THE MEDICAL DEPARTMENT OF AN ARMY.”

By MAJOR WILLIAM O. OWEN,

SURGEON IN THE UNITED STATES ARMY.

THE relation held by the Medical Department of an army to that army, should be that all sanitary dangers should be dealt with by the general in command, with the same care and detail that he would give to the information received from his trusted scouts as to an ambuscade or other danger prepared by the enemy to receive him. .

What is the truth? General officers trained in the line of the army, without a knowledge of sanitary laws beyond that possessed by ordinarily well educated gentlemen, but highly trained in a knowledge of all dangers from a military standpoint. They do not appreciate the dangers in an encampment from a sanitary standpoint.

The price which England paid in lives and money for not enforcing a proper legal responsibility upon her line officers in the Crimean war is most graphically told in McLeod's history of this campaign, with the road from the landing place to the firing line marked out by the dead bodies of animals and the camps polluted in every possible way, with regiments showing a loss of 20% , 30% and some 75% , of their average strength and one showing a death loss of even greater than its average strength. It was in this war that a general told the inspector for the medical department that he had better keep his strictures and criticisms to himself until they were called for.

In the Civil war in the United States the Union army lost from typhoid fever, diarrhea and dysentery some 80,000 men. while there were reported more than 1,800,000 cases of these three diseases. In the Spanish American war a General officer

testified that the opinion of the Chief Surgeon of his command had not been borne out by the analysis of the water supply, yet his command lost by typhoid fever, 714 men and had 9960 men taken sick with this disease in about four months, and he also testified that he did not act on the advice offered him but that he had continued to set the example of drinking from a well which he had been informed had been polluted. He, under the present absence of all law was perfectly within his own rights when he continued to do so; the cost to the United States of his example is excellently shown by the death of 714 men and the disabling of over 20 out of every one hundred (100) of his command. What would have been done to a general who had deliberately led his men into an ambushade, of which his scouts had many times told him the exact location, and had lost 714 killed and had 9960 wounded out of 44,000? All the world knows! Yet when a description of his camp which had been written by the sanitary inspector of the camp, was read to him by the Dodge Commission, he requested that he be given a copy of the report in order that he might in his capacity as a General officer bring the young man to a trial before a General Court Martial for having dared to write such a report. He was informed that the report was on file in the Adjutant General's office.

It has not been a century since a medical officer of the army of the United States was brought to trial before a Court Martial, (composed entirely of line officers,) and sentenced to dismissal from the army for malpractice of his profession, without the testimony of a medical man being given, if I read the books correctly. When the Army of the United States embarked from Mexico for the United States careful advice was given of how to avoid the yellow fever; to this advice no attention was paid—the penalty for failure to observe it was however in the loss of life from this disease. No later than March 1902 I was informed by a medical officer of the army that less than two years since he had given advice to a general officer that unless he housed his men in temporary quarters, it would result in loss of life and disability from pneumonias, colds, etc. The answer he received was that his men would remain in tents as he had placed them, and that furthermore that

when his advice was wanted he would be sent for and told to offer it; until then he could keep it to himself. With such conditions as this staring us in the face, it does indeed seem time that steps were taken, looking to the correction of these evils so plainly evident from a perusal of McLeod's History of the Crimean war, from the proceedings of the Chelsea Board on the same war, and when the published records of the Surgeon General's office are considered, such as the Medical and Surgical History of the War of the Rebellion, the report of Reed Vaughan, and Shakespeare upon the "origin and spread of typhoid fever in the military camps of the assembly within the United States in 1898" together with the report of the commission appointed by the President to investigate the conduct of the War Department in the war with Spain, and the eight volumes of the testimony taken before it.

#### THE REMEDY.

The remedy for these conditions lies within the Medical Department of the Army itself. It is for them to comply with the executive orders and organize themselves and act through the Surgeon General, the constituted head of the Corps, he in his turn through the Secretary of War, the head of the Department. Show the Secretary of War the great loss of life, the number of men disabled by diseases; show to him that the greater part of these losses are from preventable disease, that proper sanitary care would result in a very large decrease from these diseases. Let him see that these disease losses have not been the fault of the medical men with the troops, but that they gave the advice which the generals refused to heed; that these losses do not occur on the active campaign but that they occur in the camps of assembly, Instruction, or of wintering at times when there is no other enemy to be feared than disease. Let him once understand that there is a definite chain of responsibility for diseases arising in camps and the losses resulting therefrom, with the responsibility fixed by Statute Law and not by regulation—for with regulations the general in command is the executive, and there is no legal means to reach him for he only follows that which in his personal judgment is the best and proper course to follow; to undertake to control his action when he is about to meet an enemy, is

to court disaster, equally so is it to allow him to pay no attention to the information given him by his sanitary scouts of dangers lurking along his road. In truth it is a matter of almost universal knowledge that disease has in wars always killed and injured more men than ever did the offensive weapons of the enemy called "man."

Show to the Congress that such a law would result in the saving to a great extent, of money and lives, and that with the number of men thus placed on the firing line, the result on the moral and physical force of those on it will be better,—and you will at least receive a respectful hearing; for you are trying to accomplish a public good and not a personal advantage.

Let the organization insist upon a law that will enforce upon the commander a direct legal personal responsibility for his refusal to allow proper sanitary precaution to be taken, leaving him always the absolute right to refuse all sanitary suggestion whenever there is in his judgment a military necessity requiring it, and allow him to be the sole judge of when and under what condition it should be done,—hold him to a legal responsibility that his results are good ones, but do not leave him such a latitude as will allow him to go unpunished when he deliberately sets at defiance all the rules recognized the world over by sanitarians, or when he by his deliberate personal example encourages his men to violate them, allowing his men to drink water which he has been advised is polluted,—he may be immune from the disease, it is certain some of his men will not be.

As far as I have been able to obtain the history of the Boer war in South Africa and the camps of assembly and instruction in the U.S. in 1898,—they are excellent examples of the result to flow from this lack of legal responsibility before the statute law of the land. Give the general in command the proper medical advisers and compel him to take the responsibility before the law. He will then have to stop and think of the cost of human life. Leave him always free in the face of the enemy with one thought alone, "What is the best way to defeat the purpose of the enemy of the country?" But in camps of assembly and instruction he should have this added responsibility. Do this, and no



general will for a moment hesitate to insist upon the most absolute fulfillment of the rules of sanitation by the medical officers under his orders, nor on the other hand will he hesitate for a moment, when in his judgment it is necessary, to throw all sanitary precautions to the wind, for it is far better to lose 100 men to disease than to the battle for fear of results to flow from unsanitary condition. He should then simply direct his medical officers to take such precautions as they may, under conditions over which he has no control.

A search of the Statutes of the United States shows a very curious state of affairs, for of all the various laws passed by the Congress concerning the Medical Department of the United States Army almost all without exception show pay, rank, etc., but in no place do they in any way even indirectly tell what the law expects of this scientific body of men as duties, with two exceptions, one of which provides that they shall give medical attention to the families of the officers and enlisted men free of charge, and the other provides that the Secretary of War may assign its officers to such duties as he may deem for the best interests of the service.



## MAJOR OPERATIONS AT THE UNITED STATES NAVAL HOSPITAL IN BROOKLYN, N. Y., DURING 1901.

By GEORGE ROTHGANGER, M.D.,

SURGEON IN THE UNITED STATES NAVY.

**P**RI-MARY union was secured in all cases not already infected with one exception. The infection in the one exception must have been due to a ligature for it exploded on the sixth day after the operation. In the buried sutures catgut, plain or chromicized, was used. The subcuticular stitch was adopted in uniting the skin, and gave most satisfactory results.

### AMPUTATION.

An amputation of the thigh at its middle was made for tuberculous disease of the lower end of the femur. As there were fistulous openings on the outer and posterior surfaces of the thigh, a long antero-internal flap was used, in order to make the amputation as low as possible. The resulting stump was a good one.

### APPENDECTOMIES.

Two patients were operated on during the attack. The others were interval cases. Each patient had a history of at least one previous attack. Except in one case of gangrenous appendicitis the abdomen was opened by the intra-muscular method. In treating the stump the following method was used. A cuff of peritoneum was reflected from the appendix. A ligature of plain catgut was placed around the appendix at the highest point stripped of peritoneum and drawn upon gently. The appendix was divided, the stump cauterized by introducing the point of the cautery within the lumen and afterwards searing the surface. The ligature was then tightened, the reflected cuff of peritoneum drawn forward and stitched. Where no cuff could be reflected the ligature and cautery were found to be sufficient.

*Case 1.* Operated on during the attack. Cuff of peritoneum to cover the stump. Catarrhal type of disease.

*Case 2.* Interval case. Cuff of peritoneum. The lumen of the appendix was obliterated and the distal portion distended with fluid.

*Case 3.* Interval operation. Cuff of peritoneum. The appendix was obliterated near the tip and the distal extremity distended with fecal matter.

*Case 4.* Interval operation. Mesentery very short, making the removal of the appendix difficult. Catarrhal type of disease.

*Case 5.* Interval operation. No lumen present for more than an inch from the cæcum, to which the appendix was adherent.

*Case 6.* Interval operation. Stump covered with cuff. Catarrhal type of disease.

*Case 7.* Interval. The appendix was closely adherent to the iliac fossa. No cuff of peritoneum could be formed. The pocket left by the removal of the appendix was closed by stitching the free margin of the peritoneum to the mesocæcum. The appendix was found to be closed by stricture. Pus was in the lumen beyond the stricture.

*Case 8.* Interval case. The appendix was 6 inches long, with a short mesentery, making its removal difficult. Peritoneal cuff. Catarrhal type of disease.

*Case 9.* Patient was admitted with peritonitis present. Abdomen opened by a long incision parallel to the outer margin of the rectus muscle. Pus escaped. The appendix had sloughed. No attempt was made to disturb the bowels. The pus was washed away with peroxide and saline. Gauze drains were introduced and several wire sutures were inserted to prevent too wide gaping of the incision. He died seven days after the operation.

*Case 10.* Interval case. The appendix was adherent to the cæcum, coiled and twisted upon itself, and much thickened. Cuff of peritoneum reflected.

*Case 11.* Interval case. Appendix very adherent to the outer wall. In freeing it a small perforation close to the tip was found. Through this a drop of pus escaped. Drainage with a strip of gauze. Wire sutures were inserted and were tightened two days later when the gauze was withdrawn.

*Case 12.* Interval case. No cuff could be formed. Appendix was short, much thickened and adherent to the cæcum.

*Case 13.* Interval case. The mesocæcum was so short that the appendix could not be brought out through the incision. The termination of the appendix in the cæcum was conical, expanding to three quarters of an inch in diameter.

## BRONCHOCELE.

*Case 1.* The right thyroid body was removed by an incision along the anterior border of the sternomastoid. It was the seat of a cyst filled with hemorrhagic fluid and of the size of a duck's egg.

*Case 2.* The enlargement affected the whole gland. The right body was much the larger, and it and part of the isthmus were removed. It was in size equal to a fist and was closely adherent to the thyroid and cricoid cartilages and the surrounding connective tissue planes. The veins which emerged were numerous and large. The thyroidea ima were two in number, the larger having the diameter of a little finger, and the smaller that of a lead pencil. The hemorrhage was profuse. A middle thyroid vein was torn at its union with the internal jugular. Microscopic examination by Dr. E. H. Wilson showed an area carcinomatous in appearance. The patient's age was only nineteen.

## CYSTOTOMY.

The patient gave a history of gradually increasing vesical irritability, pain and hematuria. With vesical distension and rectal colpeurynter the bladder was easily opened in the median line above the pubes. In the base of the viscus an irregular shaped ulcer was found, extending close to the opening of the right ureter. The ulcer was scraped thoroughly. The local symptoms improved much, but after some months the patient died of general tuberculosis, symptoms of which were present at the time of the operation.

## FEMORAL ANEURISM.

The patient, a small Japanese, had an aneurism as large as an orange on the right thigh, extending a little above Poupart's ligament. The Cooper incision was used to uncover the external iliac which was tied with chromicised catgut one and one-half inches from Poupart's ligament. Pulsation in the tumor ceased immediately but reappeared very faintly within a minute. Within 24 hours pulsation was reestablished in the posterior tibial. Examination one week later showed complete absence of pulsation in the aneurism which had become firm. As the patient was unruly a plaster of Paris bandage about the extremity and pelvis was used to secure immobility. Three months after the opera-

tion the patient was discharged to duty. The tumor had shrunk so that it could not be seen, and could be felt only on careful palpation. The pulsation in the posterior tibial on the side of the ligature continued to be much feebler than on the sound side.

#### HERNIAS.

Sixteen inguinal hernias, one femoral and one ventral hernia were operated on. In the inguinal cases the method of Bassini was used as described by that operator in his paper in the *Archiv fur Klinische Chirurgie*. In continuance of a plan begun the preceding year the suture material uniting the conjoined tendon, etc., to Poupart's ligament was silver wire in the first three cases. In the remaining cases I returned to thick chromicized catgut. The usual number of sutures needed to effect this union was four. Occasionally five were required. The incision in the external oblique was united with a continuous fine chromicised catgut suture and the skin with the subcuticular stitch. Most of our cases were received within a few months after the production of the hernia, and therefore small. The peculiarities in each are as follows:

*Case 1.* A small left indirect inguinal hernia which was easily reducible.

*Case 2.* A right indirect inguinal hernia was diagnosed. A sac was found in the cord, not communicating with the peritoneal cavity nor with the tunica.

*Case 3.* Right indirect inguinal, easily reducible.

*Case 4.* A small right indirect, with a sac of moderate size.

*Case 5.* Right indirect. Sac large. Four sutures between the internal ring and the pubes. As the region immediately external to the deep ring appeared to be weak a fifth suture was inserted there.

*Case 6.* Left indirect inguinal. Sac long with a very narrow neck.

*Case 7.* Right indirect inguinal. Sac was of moderate size and contained a long string of adherent omentum which was dissected loose and removed.

*Case 8.* Right indirect inguinal. Large sac which was very adherent and contained adherent small bowel. The bowel was freed from the sac.

*Case 9.* Right indirect inguinal, reducible with sac of moderate size.

*Case 10.* Left indirect inguinal, associated with undescended testis. The sac was large. The testis was not fully developed, could not be brought down into the scrotum, and was therefore removed.

*Case 11.* Left indirect inguinal. The sac was so small that it was not considered necessary to remove it.

*Case 12.* Right indirect inguinal. Patient had been operated upon in 1891 according to McBurney's method. The adhesions of external oblique, conjoined tendon and peritoneum were separated. The sac was found at the internal ring and was ligated. The conjoined tendon was stitched as in the Bassini operation with five sutures, one of which was external to the inner ring. Only the outer portion of the external oblique covering of the cord could be brought together with sutures as the aponeurosis which constituted the inner portion of the upper margin of the incision had been destroyed by the former operation.

*Case 13.* Right indirect inguinal. Small sac.

*Case 14.* Right indirect inguinal. Sac long and narrow with a very narrow neck. Four sutures, one of which was placed at the outer margin of the internal ring.

*Case 15.* Femoral Hernia on the left side, partly reducible. Sac covered with a thick deposit of fat. It was freed from the surrounding tissues up into the femoral ring. It contained adherent omentum which was dissected loose and cut off. The stump of the sac was pushed into the ring and stitched to the external oblique.

*Case 16.* Ventral Hernia. A small hernia in the median line, mid way between the umbilicus and the xiphoid cartilage. The opening in the linea alba was enlarged above and below, the omentum had protruded through a tear in the peritoneum so that there was no sac. The incision in the linea alba was united with chromicized catgut sutures, that in the skin with silkworm gut.

#### KNEE JOINT.

**Floating Cartilage.** Two operations were performed for floating cartilage. In the first case two bodies were removed from the joint which was opened by the U incision. In the second case an incision was made along the inner border of the patella where the body could be felt. The cartilage was found to fast by one extremity to the head of the tibia, and was cut off close to that bone.

**Dislocated Semilunar Cartilage.** In a case where repeated dislocation of the left internal semilunar cartilage occurred that

structure was anchored by passing three chromicized catgut sutures through it and the fibrous tissue close to the head of the tibia.

Fracture of the Patella. This case had been treated with conservative measures. When the patient attempted to walk the fragments pulled apart. A straight incision was made over the line of fracture. The newly formed fibrous tissue between the two fragments was dissected away, and the fragments united with two silver wire sutures. A good result was secured.

#### WIRING OF RADIUS.

Patient had received a fracture in the lower third of the left radius, which had united in bad position. There was three quarters of an inch shortening. The lower fragment was deflected inward and pushed toward the anterior surface of the forearm. The lower end of the upper fragment was thrust inward. An incision was made on the radial side of the forearm. Nerves, vessels and tendons were pushed aside. The bone was sawed through. The deformity was corrected with difficulty. It was necessary to remove a small part of the upper fragment. The fragments were wired. Primary union was secured. The deformity was in great part corrected, and the function of the member excellent notwithstanding the great disturbance of tendons and muscles necessary to correct the deformity.



## THE EDUCATION OF THE MEDICAL OFFICER OF THE ARMY.

BY MAJOR WILLIAM C. BORDEN,

SURGEON IN THE UNITED STATES ARMY ; PROFESSOR OF MILITARY  
SURGERY IN THE UNITED STATES ARMY MEDICAL SCHOOL.

**W**HEN a man trained for the profession of medicine enters the Medical Department of the Army as a medical officer, new responsibilities and duties of a highly technical character devolve upon him. Many of these duties, while strictly connected with the responsibilities which he has to assume in relation to the care of the sick and wounded and the maintenance of the health of the army, are, at the same time, entirely unlike in character to the duties for which the civil practitioner of medicine is trained. In civil life, the practitioner of medicine has mainly to do with the practice of his profession in what might be considered its purely professional aspects. He visits the sick, prescribes for them, operates upon surgical cases and ordinarily has at his command all the facilities of hospitals which are often administered by others than himself.

In the military service his duties are radically different. The medical officer of the army has not only to care for the sick and wounded, but he has to do all of the administrative duties which are connected not only with the profession of medicine but with the personal care of the men under his charge. The sick not only have to be cared for, but they have to be sheltered, fed, clothed and, in many instances, their pay has to be attended to.

For the nursing of the sick and wounded the United States Army is provided with a Hospital Corps, composed of enlisted men. In most instances these men are untrained for the duties of nurses when they enter the service and the medical officer has to train these men for these duties. Throughout their service they stand in the same relation to him that enlisted men of the line do to line officers. In other words, it is the function of the



medical officer to attend to matters of discipline, and to see that the members of the Hospital Corps are properly sheltered, clothed and paid. Not only have the sick and the members of the Hospital Corps to be provided for, but all the necessary medicines, dressings, surgical appliances, &c., have to be obtained by the medical officer in order to meet the requirements of the sick.

In considering these manifold duties of the medical officer, it must be remembered that the Medical Department of an Army has for its end and aim, two objects:

1. To care for the sick and wounded;
2. To maintain the health of the army.

In other words, the medical officer must not only care for the sick and injured but must do everything in his power to prevent them from becoming sick, for the efficiency of the army depends not upon its strength in numbers alone, but upon the number of men who are well and able to fight when the exigencies of the service demand. The medical officer has, therefore, in addition to his other duties, to assume sanitary duties and must be the health officer and sanitary advisor of the line officer under whose command he serves.

In view of these facts it becomes a self-evident proposition that unless a Doctor of Medicine has supplemented his training for the profession of medicine and surgery by studying the duties of a medical officer he will be unable to properly and efficiently perform these duties when he first enters the service and if he does not receive adequate training before or at the time of his entrance into the service, it will be only by costly experience, often to the discredit of himself and the service and of incalculable injury to the army, that such training is obtained.

In the United States the military service presents certain peculiar features. The standing army is small and, upon the outbreak of war, is only sufficiently large to form the nucleus of the fighting force. The United States has in the past and will in the future depend largely upon volunteer troops, drawn from the country generally and, in most instances, most largely from the militia of the several states. This being the case the National Guard should be fully organized and equipped to meet the emergencies of war. As the regular army forms the nucleus of the fighting force and as its officers are men who de-

vote their lives to the profession of arms, it is their aim to so perfect the organization of the Regular Army that it can both in organization and equipment meet the demands of war when they arise. As the volunteer forces must assimilate with and conform to the methods adopted by the regular service, it is evident that the National Guard should be organized and equipped on the same lines as is the Regular Army, so that the two forces can combine and work in unison when called into actual hostilities. To this end the last Congress passed an act to promote the efficiency of the militia, which states that "the organization, armament, and discipline of the organized militia in the several states and territories and in the District of Columbia shall be the same as that which is now or may hereafter be prescribed for the Regular and Volunteer Armies of the United States, within five years from the date of the approval of this Act."

This enactment covers all the departments of the militia in the different states and, of course, includes the Medical Department of the National Guard. In connection with this reorganization of the militia the education of officers of the Regular Army and of the National Guard has in the same act received attention. The act provides; "That whenever any officer of the organized militia shall, upon recommendation of the governor of any State, Territory, or general commanding the District of Columbia, and when authorized by the President, attend and pursue a regular course of study at any military school or college of the United States such officer shall receive from the annual appropriation for the support of the Army the same travel allowances, and quarters, or commutation of quarters, to which an officer of the Regular Army would be entitled if attending such school or college under orders from proper military authority, and shall also receive commutation of subsistence at the rate of one dollar per day while in actual attendance upon the course of instruction."

There are now in the United States, five service schools to which the paragraph of the act just quoted applies. These are: The Artillery School at Fort Monroe, Virginia.

The Engineer School of Application, Washington Barracks, District of Columbia.

The School of Submarine Defense, Fort Totten, New York.

The School of Application for Cavalry and Field Artillery at Fort Riley, Kansas.

The Army Medical School, Washington, District of Columbia.

Up to the present time these schools have been used exclusively for the instructing of officers of the Regular Army, but under the provisions of the act above referred to, these schools are opened to selected officers of the National Guard.

The Army Medical School, with which we are particularly concerned, was established in 1893, and since then has had annual sessions, with the exception of a four years interval, beginning with the War with Spain. This school is carried on in the Army Medical Museum Building in the City of Washington. In this school didactic lectures are given in military surgery, medicine, the duties of medical officers, military hygiene, tropical diseases, parasitic diseases, military law, etc. Laboratory instruction is given in clinical microscopy, bacteriology and sanitary chemistry. A course in operative surgery is given upon the cadaver and in clinical surgery at the Army General Hospital, and the students are also instructed in litter drill and first aid, the Company of Instruction, Hospital Corps, which is connected with the Army General Hospital, being utilized for this purpose. The value of army medical schools has been recognized by all civilized nations. Such schools are being carried on in France, Germany, England, Russia, Turkey, Switzerland, Greece, Mexico and Japan. In some of these schools the students are composed of graduate medical officers. The officers who attend these schools graduate in medicine at regular medical schools and receive their military medical education as a post graduate course at the army medical schools. In some countries, namely, France, Germany, Russia, Turkey and Mexico, the entire training, both in medicine and the duties of medical officers, is given in government schools. Of the two methods, that of graduation from a regular medical college and post graduate instruction in military medicine, surgery and administration at an army medical school, is in my opinion the most practical in the United States. This is the method adopted in England and the United States. The British Army Medical School is directly under the control of the Secretary for War and is located at the Royal Victoria Hospital, Netley. All the medical service schools have hospital facilities and such facilities are necessary for training medical officers in

hospital administration, military surgery, hospital corps drill and allied subjects.

During the War with Spain a general hospital was established in the City of Washington, the post hospital at Washington Barracks being utilized for the purpose. A company of instruction of the Hospital Corps was attached to this hospital. This company of instruction subserves two purposes: to train Hospital Corps men and to instruct the medical officers at the Army Medical School in Hospital Corps Drill, the establishment of field hospitals and administrative work. At the company of instruction a regular curriculum of lectures, recitations and drill is carried out. To show the work done at this company of instruction, it may be stated that for the four years ending June 30th, 1902, 2449 enlisted men passed through the company and received the training which would fit them for their future duties in the Hospital Corps. The value of such a company of instruction in connection with an army medical school cannot be overestimated; indeed, it is essential that such a company should be available for the instruction of the student medical officers in the duties which would devolve upon them in the field and which can only be practically shown by the work of a company of instruction. The value of having a general hospital available for teaching in connection with the school is equally great. In such hospitals the medical officers can be instructed in the methods of administering military hospitals and can be given practical training in hospital methods as adapted to the military service, while valuable clinical instruction can be given in the medical and surgical diseases which are most commonly met with in military practice. In this connection, it may be stated that for the four years ending June 30th, 1902, 3596 cases were treated at the Army General Hospital in Washington, and this number could have been much increased had the capacity of the hospital been greater.

With this general survey of the field, the conditions as they obtain at present may be seen. We now have an army medical school in the city of Washington and have connected with it a general hospital and a company of instruction. At the present time, only approved candidates for the medical departments are given instruction in this school and it is desirable that

the school and the facilities of the school be sufficiently enlarged to admit of carrying out the provisions of the act of Congress above referred to, so that not only medical officers of the regular establishment, but officers of the National Guard may be instructed at this school. It is believed that great benefit would be derived from so extending the scope of the institution, for not only would the student officers both of the regular and state services be instructed in the technical duties of medical officers, but by association of the medical officers of the Regular Army and National Guard, the interests of the public service would be greatly furthered.

One of the greatest benefits which has followed the organization of the Association of Military Surgeons of the United States has been the mutual acquaintanceship and association to which it has given rise. If now the advantages of the army medical school, can be extended to include instruction of selected officers of the National Guard and so disseminate knowledge of the methods of administration, organization and supply of the regular medical department, it will follow that when the militia of the different states is called upon to act with the Regular Army it will be better able to conform to and carry out the methods by which the regular army works so furthering that preparedness for war without which military efficiency is impossible.

At the last session of Congress an effort was made toward the beginning for an extension of the Army Medical School such as outlined above and it is the desire of the Secretary of War and the present Surgeon General of the Army, General O'Reilly, to establish in the city of Washington a large general hospital, to have connected with it a company of instruction and to erect an academic building of suitable size for the future and extended requirements of the Army Medical School. The establishment of such a complete institution where officers of the Medical Department of the Army and of the militia of the different states can be instructed together in the peculiar and highly technical duties required of medical officers, would, it is believed, be a great step in advance and would be of inestimable value in preparing medical officers for the great responsibilities and duties which will surely be thrust upon them in time of war.

## THE INSTRUCTION OF THE HOSPITAL CORPS IN COMPANIES AND DETACHMENTS.

BY CAPTAIN FREDERICK P. REYNOLDS,

MEDICAL DEPARTMENT, UNITED STATES ARMY.

THE Hospital Corps now numbers 3000 men, being about 5% of the minimum or present (peace) strength of the Army. It consists of sergeants first class, sergeants, corporals, privates first class, and privates, and in garrison is organized into detachments and companies of instruction. The allowance for post service in the United States is 3% of the troops and on foreign service 5%. About 600 men are needed for duty at independent posts, arsenals, general hospitals, and with the transport service, and about 100 are in companies and detachments of instruction. (May 1st, 1903).

The field organization at the front consists of regimental detachments and detachments with smaller line units, ambulance companies, and field hospital detachments. On the lines of communication and at the base detachments are provided for duty with advance and base medical supply depots, rest stations, stationary and base hospitals, hospital trains, and hospital ships. For the categories at the front the allowance (according to recent Medical Department regulations) is about  $3\frac{1}{2}\%$  Hospital Corps for a brigade of infantry at war strength, together with a total of 17 medical officers or 3.4 per 1000 troops of the line. This proportion of sanitary personnel is considerably below that provided for European armies, in which for service the front an average of 4.87% is allowed.

It can readily be seen that as the field organization provides for about  $3\frac{1}{2}\%$  and that the present allowance for post service in the United States is but 3%, by taking every man the Medical Department is incapable of supplying the enlisted personnel of the field units, without considering the personnel required for

duty with stationary hospitals, supply depots, etc., at the base. It may, therefore, be stated that the Medical Department is unprepared to furnish the quota of Hospital Corps for any considerable body of troops which may take the field, and have the necessary number of men for garrison or home duty.

As defined by Army Regulations the duties of the Medical Department are: (1) Sanitary Duties. The investigation of the sanitary condition of the Army and making recommendations in reference thereto. (2) The care of the sick and wounded of the Army (including their transportation), and the management and control of military hospitals. (3) Furnishing all medical and hospital supplies. (4) The recruiting, instruction, and control of the Hospital Corps and of the Army (female) Nurse Corps. Under (4) come also the duties of maintaining discipline; of providing clothing, equipment and rations; of keeping the accounts of pay and clothing; and of preparing records, reports, and returns required by regulations and orders.

The duties of the Hospital Corps relate almost entirely to the care of the sick and wounded. We may define these duties to be as follows: In garrison,—(1) The nursing of the sick and wounded; (2) cooking, including the preparation of sick diets; (3) dispensary work—the use and care of appliances and the compounding of prescriptions; (4) clerical work—keeping records and the preparation of reports and returns; (5) outside and inside police; In the field,—(in addition to the duties in garrison) —(1) first aid to the wounded; (2) transportation of the sick and wounded; (3) care of animals, ambulance driving, and equitation, (4) the use and care of the articles of field hospital equipment including packing, unpacking, and pitching of field hospitals.

The instruction of the Hospital Corps should be of a character to enable it intelligently to perform its duties, and a well instructed detachment should not only be proficient in the work of the post hospital, but its members should be able to take the field in any capacity which the work of the Medical Department requires.

The amount of instruction required to make a Hospital Corps

man competent in his duties is large and covers many subjects. The time necessary to complete is consequently considerable. After completion of instruction, drills and practical work are necessary to maintain efficiency. His duties require superior mental qualifications and the instruction demands pains-taking effort on the part of medical officers.

The responsibility of medical officers for the discipline and instruction and consequent efficiency of the Hospital Corps is direct and positive and a proper understanding of this responsibility is essential to our success in meeting the arduous work which devolves upon the Medical Department in time of war. As in the line, active service in the field requires familiarity with all duties and conditions liable to be encountered, and to meet these conditions and perform the duties are demanded the same great essentials—discipline and training.

The regulations governing Hospital Corps instruction in the Army require that one hour's instruction be given daily, except Saturday and Sunday, in the duties of litter bearers and methods of rendering first aid to the sick and wounded, and "in the various subjects pertaining to the sanitary soldier." These subjects being (besides the duties of litter bearers and of rendering first aid), nursing, materia medica and pharmacy, clerical work, and cooking. Considering the nature and amount of instruction to be given, it would seem that one hour a day, in addition to actual work in the hospital, is not excessive and that at least that amount of instruction should be given in all detachments. It is contemplated that a well instructed private of the Hospital Corps should have a thorough knowledge of all the duties which he may be required to perform in garrison and in the field.

As it is evident that all recruits for the Hospital Corps have not the intelligence to profit by the instruction in every subject, nor have all the moral qualities required to satisfactorily perform the important duties of nurse, clerk, or dispensary attendant, the grading of privates has long been desired. By recent legislation, the Medical Department is now able to make a distinction between those qualified for these higher duties and those who for any reason are not capable of performing duties requiring intelli-



gence and special training. The former are now graded as privates first class with pay of \$18 per month, and the latter as privates with pay of \$16 per month. This classification gives every prospect of enabling medical officers to place upon a rational basis the work of training Hospital Corps men in the duties which are required of them. The general effect of the law will be to place in the first class Hospital Corps privates of excellent character, whose service is honest and faithful, and who are proficient in any special qualification, as nursing, dispensary work, clerical work, cooking and diet cooking, carpentry, or laboratory work. It is not reasonable to suppose that the intention of the law is to qualify a man in one branch of work and end the man's instruction at that point; rather its object seems to be to provide that a first class private is a well instructed Hospital Corps man, capable of performing any of his duties, and in addition, having special qualifications in some lines in which he has shown marked aptitude and has had considerable experience.

Men in the grade of private should be instructed in all duties which they are capable of performing and to the limit of their intelligence.

From a consideration of the duties of the Hospital Corps we may now state the subjects to be included in the course of instruction. These are as follows: For privates and first class privates,—(1) Discipline and the duties of a soldier. (2) Bearer drill. (3) First aid. (4) Field work. (5) Care of animals. (6) Anatomy and physiology. (7) Cooking and diet cooking. (8) Nursing. (9) Materia medica and pharmacy. (10) Clerical work. For noncommissioned officers: (in addition to the above) (11) Elementary hygiene. (12) Minor surgery. (13) Army Regulations. (14) Mess management. Of these subjects, all members of the Hospital Corps should be proficient in the first five subjects, which are the essentials for field service.

Instruction is given in all detachments at military stations and in detachments and companies of instruction. There exist at present two companies of instruction, and regulations direct the establishment of a detachment of instruction in each military department "to provide an emergency reserve under the imme-

diate control of the department commander and the chief surgeon." "The curriculum shall consist of theoretical and practical courses prescribed by the Surgeon General." The personnel, organization, and administration of companies of instruction are now defined by regulations, but no curriculum has as yet been prescribed.

**INSTRUCTION IN COMPANIES.** Under date of August 7, 1891, the Surgeon General was authorized to station, for purposes of instruction, ten additional Hospital Corps privates at Fort Riley, at Fort D. A. Russell, and at Fort Keogh. In October of the same year it was decided that the detachment of instruction at Fort Keogh be discontinued and that those at Forts Riley and D. A. Russell be increased to 30 men each and that they be designated as companies of instruction. Two years later the company at Fort D. A. Russell was given up and a new one organized at the post of Washington Barracks. On the recommendation of the Surgeon General, the company at Fort Riley was discontinued, July 22, 1896.

A "school of instruction" was established at Fort McDowell in September 1899, but was "considered as a receiving and distributing depot rather than an educational institution." It was organized as Company of Instruction No. 2 by authority of the Secretary of War, dated November 8, 1902.

A company of instruction was organized in Manila in January, 1900, and was given a definite status by the commanding general in May 1900. After attaining "a high degree of proficiency," it was disbanded August 13, 1901.

*The Work of a Company of Instruction.* Company of Instruction Number One was organized by authority of the Secretary of War, dated August 16, 1893. Until the beginning of the Spanish-American war it consisted of about 25 men, under instruction from 4 to 6 months. From May until December 1898, it acted as a casual camp where recruits were received, clothed and equipped, and sent to the front with practically no instruction. From about September 1899 until July 1902, the period of instruction varied from a few weeks to five months and many men were transferred without instruction. Only for the past few months has it been possible to adhere to a fixed period of instruction.

## ORGANIZATION OF COMPANY OF INSTRUCTION NO. 1, HOSPITAL CORPS, U.S. ARMY, MARCH 1, 1903.

## OFFICERS.

Captain FREDERICK P. REYNOLDS, Assistant Surgeon, U.S. A.

1st Lieutenant JAMES R. CHURCH, Assistant Surgeon, U.S.A.

1st Lieutenant FREDERICK A. DALE, Assistant Surgeon, U.S.A.

## NONCOMMISSIONED OFFICERS.

1 1st Sergeant.	1 Quartermaster Sergeant.
1 Mess Sergeant.	1 Company Clerk.
1 Police and Stable Sergeant.	9 Instructors and Assistant Instructors.

Total,

14

## PRIVATES ON SPECIAL DUTY. (PERMANENT CADRE).

2 Cooks.	2 Kitchen Police.
1 Dining room attendant.	1 Property attendant.
1 Ambulance driver.	1 Night Watchman.
2 Clerks.	2 Musicians.
	1 Artificer.

Total,

13

## DUTIES OF OFFICERS.

*Company Commander.* General Supervision. Company fund and mess. Instructor in first aid and field work.

*Lieutenant Church.* Instructor in first aid and noncommissioned officers' class. Clothing and personal equipment of the company, and records eturns relating to.

*Lieutenant Dale.* Instructor in anatomy and physiology, care of animals, and drill. Condition and completeness of company property, including field equipment.

## DUTIES OF NONCOMMISSIONED OFFICERS.

*First Sergeant.* In general charge.

*Quartermaster Sergeant.* In charge of field and Hospital Corps personal equipment, including medical, quartermaster and ordnance property.

*Mess Sergeant.* In charge of the ration and mess, kitchen and mess hall Assistant instructor in mess management.

*Company Clerk.* In charge of company office, records and papers. Assistant instructor in clerical work.

*Police and Stable Sergeant.* In charge of stable, public animals, and transportation. Assistant instructor in care of animals.

*Assistant Instructor.* In charge of class books, instruction rosters and other instruction records. In charge of indoor instruction and section rooms. Assistant instructor in first aid.

1 *Assistant Instructor.* In charge of outside instruction, setting-up drill, bearer drill and field work.

7 *Assistant Instructors.* Outside instruction, 4; materia medica and pharmacy, 1; anatomy and physiology, 1; first aid and bandaging, 1.

### COURSE OF INSTRUCTION.

#### FIRST MONTH.

Daily, except Saturday and Sunday.

Anatomy and Physiology.	Bandaging.
Diet Cooking.	Bearer Drill.
Calisthenics and Company Drill.	

#### SECOND MONTH.

Nursing.	First Aid.
Care of Animals.	Bearer Drill.
Calisthenics and Company Drill.	

#### THIRD MONTH.

First Aid.	Nursing.
Clerical Work.	Materia Medica.
Bearer Drill. Practical Field Work.	Calisthenics and Company Drill.

#### FOURTH MONTH.

Clerical Work.	Pharmacy.
Materia Medica.	Field Exercises.
Calisthenics and Company Drill.	

#### SATURDAY.

Inspection.	Articles of War. Company Regulations.
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Complete outlines of the instruction to be given in each subject have been prepared and printed and are used by instructors and members of the classes. In accordance with paragraph 49, Manual for the Medical Department, the discipline and interior economy of the company conform as nearly as possible to those of a company of infantry. Company routine is strictly adhered to. Recruits on joining are assigned to squads, equipped and clothed, and join the classes to at once take up the routine.

*The Personal Equipment* is required to be kept complete and in order at all times. Each man is given an "equipment sheet," (see below) which shows of what articles his equipment consists and the regulations relating to damage, loss or sale.

### PERSONAL EQUIPMENT OF A PRIVATE OF THE HOSPITAL CORPS, IN COMPANY OF INSTRUCTION NO. 1.

1. *Clothing List.* Issued to the soldier by the Quartermaster on "Clothing Schedule" and money value charged against the soldier's clothing allow-

ance. Clothing thus issued becomes the property of the soldier, but it must not be sold. Loss or damage of clothing by neglect is also a court martial offense under the 17th Article of War.

2 Blankets.	1 pr Leggings.
1 Waist Belt.	1 Overcoat (in winter).
2 Blouses.	1 Poncho.
1 Forage cap.	2 Blue shirts.
2 Cap ornaments.	3 Muslin Shirts.
4 pr Hospital Corps insignia.	3 Undershirts.
1 Canvas coat.	1 pr Black shoes.
2 Summer coats (in summer).	1 pr Tan shoes.
1 Field coat.	6 pr Socks.
6 Collars.	1 pr Suspenders.
1 Cravat.	1 pr Canvas trousers.
4 pr Drawers.	1 pr Field trousers.
1 Campaign hat.	2 pr Summer trousers.
1 Hat cord.	2 pr Blue trousers.
2 pr Gloves, Berlin.	2 pr Trouser stripes.

#### 2. *Medical Department Property.*

1 Hospital Corps Pouch.	1 Litter Sling.
1 Weeks' "Nursing."	1 Smart's "Handbook."
1 Pilcher's "First Aid."	1 Hospital Corps Drill Regulations.

#### 3. *Ordnance Property.*

1 Canteen and strap.	1 Haversack and strap.
1 Waist belt and plate.	1 Meat can.
1 Tin cup.	1 Knife.
1 Fork.	1 Spoon.

#### 4. *Quartermaster Property.*

1 Shelter tent half.	2 Shelter tent poles.
5 Shelter tent pins.	1 Barrack bag.
4 Sheets.	2 Pillow cases.
1 Box locker.	

The articles supplied by the Medical, Ordnance, and Quartermaster's Departments do not become the property of the soldier but remain Government property. The soldier is held responsible for the proper use and care of these articles, and in case of loss or damage due to his own carelessness or neglect, he is required to pay for the loss or damage, and may also be tried by court martial.

### COMPANY ROUTINE.

Company regulations and the Articles of War are read to the company once a month. Besides this, the chief of squads take up the military instruction of recruits by carefully explaining

company regulations and the duties of soldiers. During the first month two hours' instruction in the latter subject is given by a medical officer. A printed sheet is given each recruit and he is frequently questioned on the subjects covered until he thoroughly understands them. This sheet in plain language explains the regulations and customs of the service to which all soldiers are required to conform. A synopsis is here given.

#### INSTRUCTION TO RECRUITS.

(1) Military Honors. •When the salute is to be rendered. When soldiers stand at attention,—indoors, out of doors. Honors to the Colors and to National Anthem.

(2) Military titles. Manner of addressing officers and noncommissioned officers.

(3) Uniform. Civilian Clothing.

(4) Manner of approaching a sentry or guard.

(5) Military rank. How indicated. Grades.

(6) Duties of an orderly, dismounted and mounted. Manner of receiving and transmitting messages. Obedience to orders of officers and noncommissioned officers.

*Company Regulations* cover the following:

Smoking. Boisterous behavior and indecent or profane language.

Lights. Talking or noise after tattoo.

Inspection and check roll-call at taps.

Use of civilian clothing.

Uniforms authorized.

Baths. Change of bed and personal linen.

Care of hair.

Intoxicating liquors.

Leaving garrison. Passes.

Respect to Colors during playing of National Anthem.

Arrangement and care of equipment in barracks. Use of barracks bags and care of soiled clothing.

Caution regarding sale of clothing.

Fire Regulations.

*"A Noncommissioned Officer in Charge of Barracks* will be detailed by roster from noncommissioned officers on duty with the company. He will go on duty at 9.15 A. M. and will be relieved by his successor at the same time the following day. He will report to the commanding officer of the company when going on duty and when relieved. When on duty he will sleep in the guard room, and between the hours of 9.00 A. M. and 6.00 P. M. will be habitually in the guard room, except when attending to his duties as herein prescribed.

His duties are as follows:

"To take the roll calls from noncommissioned officers in charge of squad rooms at the taps and reveille.

"To receive reports from the watchman and noncommissioned officers in charge of squad rooms.

"In case of fire to give the alarm and proceed as ordered in fire regulations.

"He will make an inspection of quarters at 11.00 p. m. reporting all absentees of the company not on pass and see that all unauthorized lights are extinguished.

"Members of the company returning between the hours of 11.00 P. M. and 6.00 A. M. will report to him.

"The watchman will be under his immediate orders and he will be responsible for the efficient performance of the latter's duties."

*"The Duties of Noncommissioned Officers in Charge of Squad Rooms* are as follows:

"Responsible for the order and discipline and cleanliness of the quarters under their control; instruction of chiefs of squads; supervision of the work of room orderlies; prompt report of needed repairs; the publishing of orders pertaining to the company; the proper instruction of all men under their control in the Articles of War and in company regulations; the assignment of men to squads; the provision of material necessary for the police of barracks; the arbitration of trivial differences between men; and the performance of such other duties as are assigned to them."

#### DUTIES OF CHIEFS OF SQUADS.

"The instruction of all members of their squads in their strictly military duties as laid down in "Instruction to Recruits." The enforcement of discipline at all times and places. They will be responsible for the proper care of personal equipment, for the police around and under the bunks of members of their squads; for the packing of lockers and arrangement of clothing and equipment; for the collection of, and preservation by the room orderly of property belonging to men absent from the company; and for the proper appearances of all men leaving the quarters for any purpose."

#### DUTIES OF ROOM ORDERLIES.

"Room Orderlies will be responsible for the proper police of squad rooms, porches and surrounding grounds; of the closets, bathrooms, washrooms, stoves, and furnace rooms; for the extinguishing of lights as required by company regulations; for the heating and ventilation of the squad rooms; for the safety of property turned over to them by chiefs of squads; and for the filtering of drinking water. They will report needed repairs to the non-commissioned officer in charge; apply for necessary articles for policing; report delinquencies and irregularities of police or arrangement of equipment, and will remain in quarters during meal hours."

#### DUTIES OF INDIVIDUALS.

"The routine duties of the day will start as provided in paragraph 15,

company regulations. After beds are made down, each man will police around and under his bunk, sweeping the dirt into the aisles. Shoes must be polished, free from dirt at all times, and aligned under the foot of the bunks. Articles of equipment must be properly arranged above the head of each bunk. Lockers will be packed according to diagram on the bulletin board. Hair will be worn short, and should be cut at least once a month."

## DAILY SERVICE. (APRIL, 1903).

Reveille, first call.....	6.00 A. M.
"    assembly.....	6.20 "
Breakfast.....	6.25 "
Police.....	6.45 "
Recall.....	7.30 "
Calisthenics.....	7.45 "
Recall.....	8.15 "
Drill Call.....	8.15 "
"    assembly.....	8.30 "
Recall.....	9.30 "
School Call.....	9.40 "
Recall.....	10.40 "
School Call.....	10.50 "
Recall.....	11.50 "
Dinner.....	12.00 M.
Sick Call.....	12.30 P. M.
School Call.....	12.45 "
Recall.....	1.45 "
School Call.....	1.55 "
Recall.....	2.55 "
Drill Call.....	2.55 "
"    assembly.....	3.05 "
Recall.....	4.05 "
Supper.....	5.30 "
Retreat, first call.....	6.00 "
"    assembly.....	6.15 "
Tattoo.....	9.00 "
Call to quarters.....	10.45 "
Taps.....	11.00 "

## RECORDS, REPORTS, AND RETURNS RELATING TO HOSPITAL CORPS COMPANY OF INSTRUCTION NUMBER 1.

Daily:—           Morning Report.  
                     Sick Report.  
                     Delinquency Report. (To company commander).  
                     Report of N.C.O. in charge of quarters. (To company commander).



- Weekly:— Report of Detachment of the Hospital Corps. (To the Surgeon General).
- Tri-Monthly:— Ration Returns.
- Monthly:— Pay Rolls.  
Examination of Recruits.  
Return of the Hospital Corps.  
Report of deposits.  
Personal Report of Medical Officers. (To Surgeon General).  
Grade Average. (To company commander).  
Changes in Special Duty Details and Classes. (To company commander).  
Schedule of Calls.  
Requisition for fuel, forage, and straw. (To the Quartermaster).
- Bi-Monthly:— Muster Rolls.
- Quarterly:— Requisition for crockery, etc. (To the Quartermaster).  
Statement of charges on muster and pay rolls.  
Estimate for Clothing and Equipage. (To the Quartermaster).
- Semi-Annually:— Ordnance Returns.
- Annually:— Return of Medical Property.
- Occasionally:— Clothing Schedules.  
Detached Orders.  
Change of Status, Hospital Corps.  
Record of Summary Courts Martial.  
Charges and Specifications.  
Discharges and Final Statements.  
Certificates of Disability.  
Enlistment papers.  
Descriptive Lists.  
Efficiency Reports.  
Notification of Transfer of Property (Issued and received).
- Record Books:—Descriptive Book.  
Clothing Book.  
Letters sent.  
Letters Received.  
Company Fund Book.  
Company Order Book.  
Special Qualification Book.  
Class Books and Instruction Records.  
Record of Delinquencies.  
Duty Roster.

The company has the usual company equipment of quarter-

master property,—bunks, mattresses, pillows, bed linen, etc. It also has the complete equipment (excepting transportation) for a field hospital, a regimental hospital, and an ambulance company.

The Rations, Mess and Company Fund are managed as prescribed by regulations for companies of the line. A certain number of noncommissioned officers and privates are on temporary duty in the mess under instruction in cooking and mess management.

#### COMPANY INSTRUCTION.

Instruction is given daily except Saturday and Sunday. There are three hours of inside instruction and two and one-half of outside work, including one-half hour of calisthenic exercises.

Records of class work are kept and the daily work of each man is entered in the class books, the record being based on a scale of ten. Instructors turn in to the company office the class standing at the end of each week, and at the end of the month the weekly marks are consolidated and the relative standing of all men under instruction is published.

The experience of this company has been that classes should be limited to 20 men each. With larger classes the same results have not been obtained for the reason that instructors cannot handle more men and give the necessary time to individuals. The maximum number of privates under instruction in classes should, therefore, be fixed at 80 if the course is of four months, twenty graduate men being turned out each month.

The rivalry of class standing has a beneficial effect on the men in stimulating ambition. It seldom becomes necessary to resort to punishment for neglect of duty in classes; with but few exceptions all men work earnestly and up to their capabilities. To those who qualify the opportunity to become first class privates (with increased pay) is offered at the end of the course.

I. *Discipline.* The necessity for willing and prompt obedience to orders is at once impressed upon the recruit. It is the aim of the officers attached to maintain the same standard of discipline as in the best companies of the line, and the methods of the line in imparting discipline are followed as far as practicable. Respect for Army traditions and customs of the service is encouraged.

In a report to the Surgeon General on this subject the following aids were mentioned: "A most useful incentive to this end is to encourage in the men a feeling of pride in their corps; to guard its honor and reputation at all times, teaching them that the delinquencies of any one reflect on the organization and on each member of it, and consequently it is the duty of each man to aid in bringing offenders to justice. An esprit de corps thus established has caused privates to report their comrades for untidiness and boisterous conduct while on pass, for appearing in public places with disorderly women, etc. For the establishment of this feeling the influence of noncommissioned officers is most important and it is through it that the result is to be attained."

"The greater the individuality you give to the soldier himself and to his company . . . . . the more he feels that his individual conduct is of importance."

"It is of course to be understood that a satisfactory state of discipline can only be imparted by inspiring the men's respect and confidence in their officers, the result of conscientious and pains-taking interest in everything that concerns a soldier's welfare. In the Army the bestowal of praise is the greatest of all moral levers. A knowledge that the duty a soldier performs is observed by his officers, and that duty of any character conscientiously performed and meriting approval will receive it, has never failed to stimulate men in their efforts to accomplish the highest results."

"For minor breaches of discipline several methods of punishment have been in use in this company. For a first offense it has been customary to inflict no punishment but the man has been admonished and made to understand the position he has placed himself in, the danger he is taking of permanently injuring his record, etc. An appeal to a man's reason and sense of honor has seldom failed of good result. Confinement to quarters, denial of pass privileges, and extra (squad) drill have been the usual minor punishments. When summary court martial trials are necessary the sentence of confinement is avoided where there have been no previous convictions."

The advantages of the company routine and the association

with intelligent, self-respecting and well disciplined men are great aids in rapidly imparting to recruits the spirit of military discipline. The recruit soon learns the meaning of discipline and what is expected of him. It is important that there be in a company of instruction a considerable number of men of some service who are thoroughly trained in all Hospital Corps duties. These with the noncommissioned officers constitute the backbone of the company. By their example they furnish an ever present object lesson to the recruit and by their pride in their organization contribute greatly to its esprit de corps and efficiency.

II. *The Course in Bearer Drill* covers sixty hours, as follows:

24 Hours	{	12	School of the Soldier.....	Infantry Drill Regulations.
				Par. 10—43.
		3	The Detachment.....	Hospital Corps Drill Regulations. Par. 1—6.
		5	Alignments.....	Par. 7
		5	Marchings.....	Par. 8—22.
36 Hours	{	4	Turnings.....	Par. 23—49.
		8	Litter Drill.....	Par. 50—92.
		5	The Loaded Litter.....	Par. 93—126.
		3	Improvisation of Litters.....	Par. 127—132.
		5	Removing Wounded without Litter	Par. 133—150.
		5	The Ambulance.....	Par. 151—164.
		8	Tent Drill and Packing.....	Par. 173—187.
		1	Inspection and Muster.....	Par. 165—172.

To continue proficient after the course, it is believed that the recruit should have at least one hour's drill per week, which should be given as part of practical field exercises.

Litter drill is frequently criticised, particularly by officers of the line and occasionally by medical officers. This criticism has never in my experience been accompanied by suggestions which would improve or remedy the conditions criticised, and it has usually been based upon an imperfect knowledge of the objects of the drill or upon defective instruction or execution. Imperfectly trained men will fail in an emergency and bring discredit upon their organization, but this is no more to be considered a fair trial of the system than would be the demoralization and rout of a hastily organized and imperfectly drilled regiment of recruits.

Our present drill is the result of the experience of civilized nations in transporting wounded in battle and embodies the best features of the systems in use in European armies. Its simplicity

as compared with others, notably that of the British army, is noticeable. It is always to be considered as a means to an end, and is of value only in so far as it provides rapid and safe transportation of the disabled on the field of battle. The principle upon which it is based is that trained men will care for and transport wounded better than untrained men, and that this training can best be attained by systematic drill with the use of the equipment provided and under conditions simulating as nearly as possible those which exist during an engagement.

III. *Anatomy and Physiology.* Instruction in anatomy and physiology is limited to one month, and comprises twenty hours of lectures and recitations.

No attempt is made to consider the minutiae of anatomy or the details of physiological action, but each man who passes in this course has a sufficient groundwork to serve as a basis for subsequent study, and to enable him to understand the subjects which come later in his course of instruction. Technical terms are eliminated so far as is practicable, and the course is arranged for the comprehension of the dumbest man. Particular stress is laid upon the circulatory system, and the accurate location of all of the most important blood-vessels. Each man locates the principle arteries in the living subject, and by practice learns the amount of force necessary to effect complete compression.

The lectures are illustrated by means of a skeleton, a manikin, and large drawings. A portion of each hour is spent in answering questions on previous lectures and one day each week is devoted to review.

The location and relations of the various organs are illustrated by the manikin, and in addition, the men are taught to describe these locations as accurately as their elementary knowledge of anatomy permits.

It has been found that 80% of the men make a passing mark in this subject. At least 5% of the class is incapable of profiting by the course.

*The Instruction in Diet Cooking and Nursing* is given by Miss Elizabeth Stack, a trained nurse and dietist, who has been in charge of this work since 1898.

IV. *The Course in Diet Cooking*, aims to give the private of the Hospital Corps instruction in the preparation of the various articles of diet furnished for the use of the sick in military hospitals. Each man actually prepares the various diets and also receives practical teaching in the care of kitchen utensils and of those contained in the field mess and food chests. Effort is made to give the man an understanding of the particular uses of different diets and also how to make use of the components of the field and garrison rations as food for the sick. With but few exceptions all the men profit by the instruction and the majority are qualified to prepare the articles taken up in the course. It has been found that about 10% of those instructed become proficient and are capable of preparing and serving the usual hospital sick diets. A liking for cooking and work in the kitchen is not to be expected of the majority of men who enlist. Proficiency in this line also requires a considerable degree of intelligence.

#### COURSE IN DIET COOKING.

(1 Month).

1. ON FOODS: The five food principles. Use in care of sick. Hospital dietaries.
2. MILK DIETS: Sterilization and care of milk. Preparing milk in various forms; punch, junket, whey, koumyss.
3. LIQUID DIETS: Meat juices, beef juice, beef tea, etc. Chicken broth, mutton broth.
4. LIQUID DIETS: Cereals. Gruels,—barley, rice, arrow root, oatmeal, toast water, hard bread gruel.
5. FRUIT JUICES: Lemonade, limeade, orangeade.  
BEVERAGES: Tea, coffee, cocoa, chocolate.
6. EGGS: Eggnog, sherry and egg, egg lemonade, egg broth.
7. Practical review of milk and liquid diets.
8. GELATINE: In combination with beef juice, wine, coffee. Fruit juices as jellies.
9. EGGS: Poached, soft cooked, omelet, custards,—soft, baked.
10. BREAD: Toast,—milk, dry.  
CEREALS: Porridges,—oatmeal, farina, rice.
11. PUDDINGS: Bread, rice, tapioca.  
FRUITS: Fresh and dried, stewed and baked.
12. BEEF: Broiled, scraped on toast, beef sandwiches.
13. SERVING OF FOOD: Preparing tray, care of utensils, etc.
14. REVIEW of milk, liquid and semi-liquid diets prepared and served by class.

15. POTATOES: Boiled, baked, mashed, creamed.
16. THE FIELD RATION: General instruction in preparation of field ration
17. CONTENTS OF FIELD FOOD CHEST.
18.     "         "         "         "         "
19.     "         "         "         "         "
20. REVIEW.

*V. Instruction in Nursing* covers two months. The class work is made as practical as possible. All members of the class make beds, take temperatures, make out charts, give baths, and prepare enemata, solutions, dressings, etc. Particular attention is given to instruction in the care of helpless and unconscious patients.

COURSE IN NURSING AND WARD MANAGEMENT.—FIRST MONTH.

1. The hospital ward: its contents, furniture, utensils, supplies, etc. Care of ward;
2. Bedmaking.
3. Admission of patient; care of effects.
4. Observation of symptoms.
5. Clinical thermometer. Temperature taking.
6. Pulse and respiration.
7. Charting and recording temperature, pulse and respiration.
8. Baths,—bed, basin, foot. Cleansing bath.
9. Preparation of simple enemata; instruction in the use of the various instruments and care of same.
10. REVIEW.
11. Use of disinfectants in general ward work.
12. Medicines and their administration.
13. Treatment of inflammation (simple cases).
14. Preparation of patient for operation.
15. Preparation of surgical bed.
16. Asepsis and antisepsis. Sterilization.
17. Mode of preparing simple dressings; cotton and gauze, sponges, wipes, etc.
18. Simple dressings. Instruments, surgeon's table.
19. Disposition of soiled dressings, infected bedding, patient's clothing, Necessity for disinfectants in care of above.
20. REVIEW.

SECOND MONTH.

1. Daily routine of ward work, medical and surgical.
2. Bed making for special cases,—surgical, medical, fracture.
3. Bedside notes for special cases.
4. Treatment for special cases.
5. Special diet and feeding.
6. Bathing in special cases.

7. Enemata and medication in special cases.
8. Nursing in typhoid fever.
9. Use of disinfectants in special cases.
10. REVIEW.
11. Nursing a surgical patient following an operation.
12. Treatment of inflammation in special cases.
13. Nursing in contagious diseases.
14. Nursing in convalescence.
15. Ward emergencies.
16. Dissolution; care of body, autopsy.
17. Wardmaster's table: its contents, records, charts, requisition slips.
18. Field furniture and bedding; setting up of field furniture.
19. " " " " " " " "
20. GENERAL REVIEW.

VI. *Care of Animals*.—This course is entirely practical, and extends over a period of one month.

#### CARE OF ANIMALS.

1. Nomenclature of equipments; their uses; taking apart and putting together; care and cleaning. Care of horse equipment in the field.
2. Anatomy of the horse.
3. Grooming, handling, feeding, watering, care after exercise.
4. The halter and watering bridle. Blanket and surcingle.
5. To mount and dismount without saddle. Position of trooper mounted.
6. Aids to horsemanship. The gaits of the horse. To walk, trot, and gallop without saddle.
7. The curb bridle. The saddle and saddle blanket. To mount and dismount with saddle. The spur.
8. To roll bed blanket, overcoat, and shelter half. To pack saddle.
9. The ambulance. The army wagon and escort wagon. Wagon and ambulance harness. To harness horses and hitch to wagon or ambulance. The picket line.
10. To pack saddle. To load and unload cargoes.

The men are first instructed in the nomenclature of the horse and of the mounted equipment, and are then shown how to put on properly the folded blanket and watering bridle. A considerable portion of the month is then devoted to the position of the trooper mounted, with and without the saddle, and the various aids to horsemanship are carefully explained. A portion of each hour is given to the mounted exercises, which seem to allay the fear many recruits show for the horse. Instruction is given in the use of the pack saddle, though few men show aptitude for this



work. Every man is given practice in hitching up an ambulance team, and in driving the ambulance. The proper packing of a saddle for field service is taught and the use of the various parts of the field equipment is shown.

Under the direction of the stable sergeant, each recruit has practical instruction in grooming, feeding, watering, and stable management, together with the actual care and cleaning of harness and horse equipment.

About 70% of the men show proficiency in the course.

VII. *The Instruction in First Aid* covers two months. The work of the first month consists of lectures and recitations and that of the second month is devoted to the practical application of the first month's instruction. The subject is considered under the following heads:—

#### FIRST AID.

I. *Wounds*. Definition. Varieties. Characteristics of each variety. Characteristics of gunshot wounds. Poisoned and infected wounds. Healing of wounds. Causes of death from gunshot wounds. Indications to be met in treatment. Means at hand for treatment. Methods of exposing and examining wounds. Diemer's rules. Burns and bruises. Freezing. Sprains. *Shock*. Causes. Symptoms. Diagnosis. Treatment. Treatment in the field.

*Wounds of Regions*. Symptoms peculiar to wounds of the various organs.

II. *Asepsis*, or surgical cleanliness. Infection or sepsis. Suppuration. Disinfection and antiseptics.

III. *Fractures*. Definition. Varieties. The symptoms or signs. How fractures unite. Compound fractures. Gunshot fractures. Principles of first aid treatment. Method of exposing fractures. Possible dangers in handling. Reduction. Splinting. Use of garments for support. Treatment of special fractures.

*Dislocations*. Definition. Characteristics of. Diagnosis. First aid treatment.

IV. *Foreign Bodies*. Eye. Ear. Nose. Throat. Symptoms. Dangers. Treatment.

V. *Asphyxia*. Smothering by gases. Smothering by hanging. By pressure on the chest and other obstructions to breathing. Drowning. Principles of treatment of asphyxia. Rescuing. To restore breathing. Artificial respiration and other means.

VI. *Hemorrhage*. The heart, arteries, and veins. Lines of the arteries. Outlines traced on the skin. Points for pre-sure. General symptoms. Internal hemorrhage. Control of hemorrhage. Natural means. Necessity

for artificial assistance. First aid methods. Stopping hemorrhage by patient himself.

VII. *Emergencies in General.* Symptoms. Diagnosis. What to look for. Indications and symptoms. General rules for emergencies. Unconsciousness. Most common causes:—injury, fainting, heat, alcohol. Principles of diagnosis in the different cases. Treatment of each.

*Poisons.* General classes. Symptoms of each case. Treatment. Usual means at hand for first aid treatment. Special poisons. Most common poisons.

VIII. *The Instruction in Field Work* is entirely practical in character and covers all duties of the Hospital Corps in the field. Effort is made to simulate field conditions whenever practicable.

#### COURSE IN FIELD WORK.

1. Uses of the First Aid Packet.
  - (a) Application to wounds of all regions.
  - (b) Slings.
2. Uses of other articles in the Hospital Corps and Orderly pouches.
3. First aid treatment of fractures in all regions of the body.
4. The methods of transporting wounded in war. Positions on the litter. Improvised litters. Without litters. Use of ordinary wagons.
5. Search for wounded. Patients tagged. Wounded cared for as indicated, using first aid equipment and extemporized materials.
6. Use and care of articles of field hospital equipment.
7. Organization of the regimental and of the field hospital.
8. Pitching, striking, and packing field hospitals.
9. Organization of the ambulance company. Work of the ambulance company during an action. Establishment of aid stations. Collection and care of the wounded from the firing line to the field hospital.

IX. *The Course in Clerical Work*, covers two months and is taken by all men who can profit by it. About 20% of the recruits received are not capable of understanding the subject. Of those instructed it is estimated that about 15% are prepared to do the routine work in a hospital office under the direction of a noncommissioned officer. The work of the course consists in taking up each of the usual reports and record books connected with medical department administration by first explaining the object of the paper, then the method of preparation, and finally requiring each man to make out a complete copy for examination and criticism.

X. *Materia Medica and Pharmacy.* Inasmuch as a large percentage of the men have a common school education only, it

is obvious that the method of instruction in these branches must be simple in order to be understood. The class room is fitted up with charts and illustrations explaining the fundamental principles in practical pharmacy, while apparatus and specimens of crude as well as prepared drugs are used for purposes of instruction.

During the first month 20 hours are devoted to materia medica and 20 hours to pharmacy.

The student is supplied with a brief outline on the subjects of materia medica and pharmacy, compiled in accordance with the Army Medical Supply Table, which treats all preparations in a short, concise manner, not beyond the average man's comprehension. The drugs are taken up in alphabetical order and as each drug is discussed, mention is made of the official name, the English name, the synonym, source, character, tests, action and dose. Specimens in crude and pure form are shown. Official names, dosage, and the metric system are the chief stumbling blocks.

In teaching practical pharmacy, the student is familiarized with the processes and apparatus in common use, and the manipulations behind the prescription counter.

During the past two years 415 members of the Hospital Corps have received this instruction; 110 graduated with a class standing of 90%, 96 with an average of 80%, and 102 with an average of 70%, and the remainder below 70%. In examinations for promotion to the grades of hospital steward and acting hospital steward, 29 of those who have taken the course have passed with high averages. Seven men have been assigned to duty as dispensing clerks in the dispensary of the general hospital and have performed their duties satisfactorily without other knowledge of the art than that obtained in this course. 37 men have been transferred from the classes on account of lack of aptitude. It has been the experience that about 80% of recruits of the Hospital Corps can be given this instruction with satisfactory results, and that about 20% of those instructed can be made into competent Army dispensing clerks by their course of instruction in the company.

*Noncommissioned Officers' Instruction.* All noncommissioned officers of the company, in addition to their other duties, attend one hour's instruction daily. In this noncommissioned officers' class are included certain privates who have completed the course in the company and are candidates for promotion to the grades of sergeant and sergeant first class.

1. Hospital Corps Drill Regulations. Recitations and drill with company.
2. Army Regulations. Recitations.
3. Materia medica and pharmacy. Lectures and practical work.
4. Property responsibility and accountability. Recitations.
5. Minor surgery and first aid. Lectures, recitations and practical work.
6. Clerical work. Practical in company office.
7. Mess management and cooking. Practical. With noncommissioned officer in charge of mess.
8. Elementary hygiene. Lectures.
9. Nursing and ward management. Practical in hospital.

In most of the courses printed outlines are followed.

#### USEFULNESS OF COMPANIES OF INSTRUCTION.

I think it can with confidence be stated that Hospital Corps companies of instruction have demonstrated their usefulness and are no longer an experiment, and that a well regulated company affords the best and quickest means of imparting uniform instruction to recruits. It is hardly reasonable to expect that a man on completing four months of instruction in a company is well instructed in all his duties. Many duties, such as nursing and dispensary work, require months of practical training to reach proficiency. In other branches of the service a man is hardly out of the recruit class in four months and is not considered well instructed in less than a year. It is to be expected, however, that four months in a company should make an average recruit a soldier who has a knowledge of discipline and understands what is expected of him, and who is capable of performing with some degree of skill, most of the duties of the Hospital Corps in garrison or in the field.

The principles upon which company work should be based appear to be; (1) to at once impart a thorough knowledge of discipline in the same way and by much the same methods as is imparted in the line of the Army, with which the Hospital Corps

is always serving. (2) To teach men the principles of order and neatness, both as regards themselves and their personal equipment and also to familiarize them with the departments of a hospital and the articles with which they work. (3) After this, to impart to each man a knowledge, as far as his mental capacity will permit, of practical nursing, of preparation of diets for the sick, of first aid and transportation of the wounded, and of ambulance driving and care of animals, (4) To teach them to care for themselves and the equipment entrusted to them in field service, and to be familiar with the usual duties of Hospital Corps men on the march, in camp, and during an engagement. (5) To instruct in clerical work, materia medica and pharmacy, those who have aptitude for such work.

The training of non-commissioned officers is an important duty of a company of instruction. In companies a uniformly high standard of noncommissioned officers is maintained, the result of which would be of great good to the service. Noncommissioned officers trained in companies could do much toward disseminating throughout the service uniformity in Hospital Corps instruction, discipline, and esprit de corps. To any one who has considered the subject, the advantages of such a system of training must, I think, be obvious.

The company now stationed in Washington is of especial importance to the Medical Department for the reason that it is available for the instruction of student officers in the Army Medical School in field exercises and in Hospital Corps administration, instruction, and discipline. It also provides opportunity to make practical tests of articles of field equipment and is prepared to demonstrate at any time the organization and work of a field hospital or an ambulance company, having at hand the specified equipment and men trained in their duties. The company, therefore, can at once take the field, either as an ambulance company or a field hospital. The company has represented the Medical Department of the army in numerous public ceremonies, which during the past two years have included the inauguration of President McKinley, his funeral ceremonies, ceremonies connected with the dedication of the Rochambeau monument, and of the

Army War College. Numerous public exhibitions have been given which have been largely attended and have excited considerable interest in Hospital Corps instruction and in the new field organization and equipment of the Medical Department. The company attended the encampment of the National Guard of Pennsylvania at Gettysburg, Pa., going and returning by marching, at which point it established a regimental hospital; at the Army maneuvers at Fort Riley, Kansas, during the past autumn, the company organized and largely manned both Field Hospital No. 3 and Ambulance Company No. 3. It also manned the field hospital provided for the use of the Grand Army of the Republic at its recent encampment in this city.

#### ADVANTAGES OF COMPANY DUTY FOR MEDICAL OFFICERS.

The duties of the medical officers attached to Company of Instruction No. 1, have previously been stated.

The advantages, both to the medical officer and the Government, to be derived from such a tour of duty are many and important. First, is the opportunity to learn thoroughly the routine work of the company in order that there may be available medical officers to take charge of similar companies. The work is of a special character and a medical officer cannot take up such work and achieve satisfactory results until he has by experience learned the routine and methods employed. To gain this experience requires many months of application. Second, the medical officer can learn to the best advantage the methods of teaching Hospital Corps men and of imparting and maintaining discipline. Third, valuable practical experience is to be gained in the use of the field equipment and in the organization and work of ambulance companies and field hospitals. There are also unusual opportunities for medical officers to investigate and make trials of new articles of field equipment and to suggest improvements to those now supplied.

#### UNIFORM INSTRUCTION TO RECRUITS.

I take the liberty to repeat the following suggestions which were contained in a report to the Surgeon General, dated August 31, 1901. "With a view to uniformity and as the most effective and satisfactory method of training Hospital Corps men, I would

suggest that companies of instruction be attached to general or post hospitals having a capacity of 30 beds or more,—all Hospital Corps men on duty at the post to belong to the company or companies, those on duty in the hospital to be considered as on special duty. The number of men detached from the company for special duty in the hospital should not exceed one-third of the company. A company having a maximum quota of say 150 men, could ordinarily furnish the necessary detail for a hospital of 150 beds and have 100 men for company duty. At hospitals having a capacity of over 150 beds, more than one company might be attached; for hospitals of, say 160 to 300 beds, two companies; over 300 to 400 beds, three companies; over 400 to 500 beds, four companies, etc.

“Suppose, for example, there were attached to a 150 bed general hospital a company of instruction of 150 men. Fifty men could be on special duty in the hospital, one-third of whom, (say 17,) constituting the permanent force and two-thirds, (say 23,) making up the temporary force under instruction. After a few months this hospital would turn out about twenty trained Hospital Corps men each month including the necessary quota of noncommissioned officers, who had had four months company instruction and had passed through the different departments of the hospital, without in any way interfering with the latter's most economical and efficient administration. Two or three such companies attached to large hospitals could supply the Army and could keep it supplied with uniformly trained Hospital Corps men, a result well worthy of consideration.

“In time of war the uniform training of all recruits might be begun at once by organizing as many companies of instruction as were necessary and attaching them to base hospitals. Should the conditions necessitate the mobilization for field service with the least possible delay, the recruits might be passed through the company, equipped, and sent to the field without hospital instruction. Also, the length of the period of instruction in the company might be reduced. Hospital training being the least necessary in the personnel of ambulance companies and regimental detachments, men without such training should prefera-

bly be supplied to these field units and men with hospital experience reserved for service at the base or permanent hospitals and field (brigade) hospitals."

#### HOSPITAL CORPS INSTRUCTION AT POSTS.

The instruction of detachments at posts, in order to be systematic should cover the prescribed subjects in a manner so that the work will be begun and completed in a given time, similar to the method pursued in the instruction of troops of the line. Such a course might be outlined as follows:

1. Anatomy and physiology, 20 hours, (one month).
2. Nursing. 40 hours, (two months).
3. Materia medica and pharmacy, 20 hours. For selected men only.
4. Elementary hygiene, 20 hours, (one month).
5. First aid, 40 hours, (two months).
6. Bearer Drill, 40 hours, (two months).
7. Field work, including use of field equipment, 20 hours, (one month).

Instruction in cooking, clerical work, and care of animals should be given while the men are on duty in the kitchen, office and stables.

The "school year" by concluding with bearer drill and field work would thus be preparatory to the annual practice march or field maneuvers of the troops of the post. The practice of closing the post hospital and going into camp at the post by establishing a small (regimental) hospital where the post sick may be transferred and treated, is to be commended.

To complete a man's training a system of rotation of duties in hospital is necessary. It is hardly necessary to state that such rotation should never be allowed to interfere with the efficient administration of the hospital or the welfare of the sick. Some men will never be cooks, and some will never be nurses, but such facts do not obscure our duty of making the Hospital Corps men under our charge as proficient in all their duties as their capabilities will allow.



## Reprints and Translations.

### THE MILITARY MEDICAL JOURNALS OF SPAIN FOR 1902.

BY LIEUTENANT CHARLES NORTON BARNEY,  
MEDICAL DEPARTMENT, UNITED STATES ARMY.

*LA MEDICINA MILITAR ESPAÑOLA, (Concluded).*

THE WORKINGS OF THE SANITARY SERVICE ON THE BATTLE-FIELD. Isidro García Julián.—Since the sanitary service and the other services of an army are as vitally related and interdependent as are the various organs of a living being, field and staff officers should familiarize themselves with the tactics of the sanitary service and medical officers should acquire some knowledge of the tactics of the other services, in order that there may be secured that close collaboration which is so necessary to good results.

This idea is not a new one, but its most enthusiastic advocate, M. Benech\*, Chief Surgeon in the French Army, who for the past four years in his lectures to the medical officers stationed in Paris and to the students at the War College, has been insisting upon its importance, renders homage to the Prussian General and Minister of War Verdy du Vernois, who advocated it more than 20 years ago, to Colonel Bischer, Chief Surgeon of the 2nd Corps of the Swiss Army, who wrote on this subject in 1893, to Pelzer, Division Surgeon in the German Army, and to Lieut. Colonels Hausambblas and Kisma-nick. The idea has been put into practice not only in France, but in Germany as well, where tactical instruction has been given medical officers since 1898.

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\*Author of the very original, suggestive and valuable "Le service de santé en campagne; données pratiques a l'usage d'état-major et des médecins chefs," 2 vols., 12°, Paris, 1901-1902.—C.N.B.

The author of this article, after showing how dependent are the disposition and workings of the sanitary units—particularly on the firing line and at the regimental aid and dressing stations—upon the dispositions and workings of the troops to which they are attached and upon the various contingencies of battle, and after noting that even with the greatest provision and preparation the sanitary matériel and personnel must be insufficient at once to dispose of the veritable “epidemic of traumatisms” (Pirogoff) which accumulate within the space of a very few hours, describes in detail the sanitary service of the first line, treating of it under two headings: (1) On the firing line, and (2) At the dressing station.

(1) *Service on the firing line* has for its objects the search for the wounded on the battlefield, the application of first aid to them, and their protection from the fire of the enemy until it be possible to transfer them to the dressing station. By Spanish regulations this work is placed under the charge of the medical officer youngest in commission among those serving with each body of troops. He has under his control a sanitary personnel consisting of four dressers or nurses, eight litter bearers and a corporal of the Hospital Corps to each battalion, and the sanitary matériel represented by the first aid packet (which every officer and soldier must, by regulation, carry upon his person), litters, medical and surgical chests, and occasionally carts and wagons.

The probable number of casualties may be estimated, according to statistics of modern wars, as follows:

10 to 15%	of the total effective of an army,
20 to 25%	“ “ “ “ “ “ “ corps,
25 to 30%	“ “ “ “ “ a division,
40 to 60%	“ “ “ “ “ a regiment.

These percentages represent the ordinary maxima in the larger battles. Of these casualties one quarter will be killed, and a second quarter will be able to walk to the dressing station. On the other hand, in case of victory it is necessary to remember that the enemy has approximately an equal number of casualties, and that when he is being driven back from his

position he has to abandon two-thirds of them to the sanitary service of the conqueror. These figures are to be considered in connection with the area of the ground over which the wounded are scattered and the amount of time necessary to transport each one.

From his experience of three years' campaigning in Cuba, where four medical officers were killed and three were permanently disabled while assisting wounded on the battlefield, and one gained the cross of San Fernando for dressing the wounded of his battalion under fire before attending to his own wounds, the author concludes that it is ordinarily impracticable for the medical officer under the conditions of modern warfare to carry out literally the Spanish regulations for field service, which provide that he shall take his sanitary detachment into the *mêlée*, perhaps at the decisive moment of an attack when the troops are advancing from position to position under such cover as the terrain affords to shield them from the hail of bullets, and then and there direct the collection and transportation of the wounded, prevent malingerers and the slightly wounded from leaving the ranks, determine which men need attention first, what dressings should be applied to others, etc. Unless there is reasonable probability that his mission will succeed, because of conditions of the terrain or contingencies of the fight, or because an advance of the line leaves the zone where the wounded lie in greatest number less battered by the enemy's fire, or because of the occurrence of a period of truce or calm, the medical officer can accomplish nothing by thus exposing the lives of his subordinates, the life of the wounded man whom he is trying to assist, and his own life. Sanitary soldiers on the firing line are especially exposed, and their services are so important to their comrades and so beneficial to the morale of the troops that their lives should be endangered as little as practicable.

Beaunis, from his experience in the Franco-Prussian war, says, "By the force of facts I am brought to this conclusion: the wounded ought not to be carried off the field while the fighting is in progress. Collecting them under the enemy's

fire is extremely dangerous, unnecessary, and usually impracticable." Beaunis also states that leaving the wounded on the battlefield is not cruel, as might appear at first sight, since the active part of an engagement does not last longer than five or six hours as a rule, though the battle as a whole may last a longer time, and the wounded who cannot wait as long as this without danger are few, with the exception of those cases which present hemorrhage.

The first aid packet was adopted so that the wounded might assist themselves with it, pending such time as they could be attended later by the sanitary service. The author (Julián) thinks that the wounded are hardly ever able to apply the first aid packet themselves; in one case because the wounded man has fallen unconscious, in another because the lesion is in the arm, in a third because it is in such a position that the patient cannot see it, and in a fourth because the discovery of the wound necessitates removal of blouse or trousers—an impossibility for the patient to accomplish by himself in case of fracture or joint lesion. The author further states that during the campaign in Cuba he saw only one person, a captain, who knew how and was able to apply the packet to himself; and is of the opinion that the sanitary soldiers, in gathering up the wounded under the direction of the medical officer, taking advantage of all the contingencies of the fight, advances of the line, and conditions of terrain, are the only ones able to render first aid. [This is decidedly not the experience of American military surgeons. C.N.B.]

At first the sanitary soldiers devote their efforts to supplying the wounded with water to drink and dressing those only who present hemorrhage or fracture. Severe primary hemorrhage from a large vessel causes the death of the patient before he can be attended; and the greater part of the hemorrhages which come under the surgeon's care are those in which syncope has delayed the outpour of blood. [Synopsis has already been given of an article published by this same author in the "Revista" on this subject.] Dressers should not attempt to make complete diagnoses of fractures, but

should merely try to recognize them as best they can, and to immobilize them. Doing up a sprain as a fracture would be erring on the safe side.

(2) *Service at the dressing station* has two objects, putting the severely wounded into such condition that they can stand transportation to hospital, and returning to their respective commands such of the slightly wounded as are able to do duty after having their wounds dressed,—excepting in the latter case, of course such as may belong to the enemy.

The efficiency of modern fire-arms at long range makes it necessary that the troops shall take battle formation while they are still at a considerable distance from the enemy (2000 yards or more). The battle is usually opened by artillery fire, under cover of which the infantry advance to take their positions. As the advance progresses infantry fire is soon added. Though at first the firing is not accurate, it is sufficient to cause some casualties. At a distance of 700 to 800 yards from the enemy the firing line ceases to advance so openly, and, deployed as skirmishers, but still under the control of the section commander, halts temporarily for the purpose and fires by volley.

If, merely because there are casualties occurring, the dressing station should be established at this stage, which is hardly more than a preparatory one, it would soon be too far from the troops it is intended to care for, as these keep marching on toward their positions. Transportation of the wounded by litter from firing line to dressing station would be over such a long distance as to be impracticable, and as a result the dressing station so prematurely established would soon cease to carry out its function. At this stage of the fight the wounded should be given first aid from such resources as are comprised in the first aid packet and hospital corps pouch. The senior medical officer on duty with the regiment, who should have full knowledge of the part which the regiment is called upon to play in the tactics of the battle, should establish the dressing station after the troops have stopped advancing, the firing has become general, and the losses are numerous.

When the units of a brigade are together it may be convenient to establish one dressing station early, leaving the establishment of others until it is demanded by the advance of the troops and the necessities of the fight.

According to Spanish regulations the dressing station should be placed near the center of the rear guard of the command to which it belongs, a little outside the line of retreat (which implies a knowledge of what this will be), in a place easily accessible to litters, and to ambulance wagons also if possible, and at any rate where there can be direct communication between it and the ambulance station or field hospital.

Because of the increasing range of modern fire-arms it is getting more and more difficult to protect dressing stations from the enemy's fire. The projectiles of both small arms and cannon sweep the space in which dressing stations are installed; and many of the larger projectiles, charged with explosives and provided with time fuses, wound forces which formerly would have been considered out of danger.

As the brigade reserves are likely to be the objective of the enemy's artillery fire the dressing stations should not be placed in line with them nor too close to them. Buildings should not be occupied as dressing stations, since they offer excellent targets for the enemy's cannon; and, should they be ignited or demolished by a shell while they are crowded by an accumulation of wounded, the catastrophe would be horrible. On the other hand, it is well to have the dressing stations reasonably near dwelling houses; not only because hay, straw and other materials for bedding, water, shade trees and wagon roads will usually be found in the vicinity, but also because such houses would later serve as nuclei for the formation of temporary field hospitals, which after the battle are charged with the care of such of the wounded as cannot be transported to the rear.

But the dressing station should be protected to such an extent as is possible; by the utilization of depressions of terrain, obstacles of all sorts, and a soft soil where bullets will not ricochet. Fortunately, as the trajectory of modern fire-

arms is more nearly rectilinear than that of the older arms, obstacles need not be so high as formerly in order to give considerable protection. An obstacle six feet in height will protect against infantry fire, and an obstacle nine feet in height will give reasonable security against direct fire from light artillery. Within the zone of effective fire the greater the range at which the enemy is shooting the closer one must keep to these obstacles in order to secure protection. But no place within this zone can be considered really safe, and consequently such of the wounded as are able to bear transportation should be evacuated to the field hospitals as rapidly as possible.

Spanish regulations describe in detail the improvisation at dressing stations of small field stoves by which water can be boiled for the sterilization of instruments and dressings and the preparation of antiseptic solutions, surgical serum, and drinks for the sick. Though it is true enough that a crude stove can be set up in a few minutes, yet it is unlikely that the commanding general would tolerate during a battle the cloud of smoke which would be produced by such fuel as is ordinarily obtainable at such a time; and it is certain that an hour or more would be needed to get the water boiling, and almost another hour would elapse before the water could be considered sterile. The latter difficulty has been solved by Tarel, who has found that if a little common salt be added the water can be thoroughly sterilized by only a few minutes boiling.

The wounded accumulate very rapidly at a dressing station, and the personnel, the time, and even the water required, for such a period of sterilization as is described in the Spanish regulations referred to are usually lacking. Nimier and Laval advise that water which has been boiled the night before be carried in the regulation reservoirs, and that it be not wasted in sterilization of instruments, as these can be sterilized quite as thoroughly and much more quickly by passing them through an alcohol flame. It is of course not necessary to have a lamp for this purpose; the alcohol may be

poured out on a meat can or other flat surface and ignited. The instruments should not be held in the flame so long that they acquire a blue color. Wolbrecht has devised a method of "dry sterilization" for the hands of the surgeon and his assistants and for the surroundings of the wound, by means of the tincture of soap. This method is now under investigation. When water is abundant instruments may be sterilized by putting them in boiling water provided the water has been boiled so long that all the air contained has been expelled. If the contained air has not been expelled by boiling, black specks are produced on the steel. These can be prevented by adding to the water sodium carbonate in the proportion of one part in a hundred. If sodium carbonate be not at hand, sodium borate may be used.

As a general rule modern bullet wounds may be considered aseptic, and the less disinfection attempted the better. Disinfection when unnecessary is positively harmful as it damages the tissues to some extent and makes them less resistant to any infection which may get into the wound at a later period. As Tarel puts it, "*Moins on fait, mieux on fait*"; and Nimier and Laval are of the same opinion as to the results of attempting to disinfest these wounds. On the other hand, the experience of Watson Cheyne in the South African War and of Spanish surgeons in recent colonial wars shows that suppuration rarely results when these wounds are not subject to disinfection as a routine, even though conditions for securing aseptic treatment be very imperfect. The reason is that the modern bullet is of small calibre: it does not ordinarily carry in with it other foreign bodies, such as pieces of clothing, etc., it tends to separate rather than destroy tissues, and leaves a track of very small calibre, which is quickly obliterated by apposition of the tissues, and in which as a consequence there is little opportunity for exudates to accumulate and afford culture media for germs.

The difficulty of doing dressings and performing operations in a kneeling or squatting position, and the necessity of improvising an operating table are recognized by the Spanish



regulations, but the author thinks that some apparatus should be adopted which could easily be attached to the litter, such as the Dujardin-Strauss litter-support used in the French army.

Too little attention has been paid by military surgeons in general to means of illumination at the dressing station. But this is a subject of some moment on account of the important part which the sanitary formations of the first line have to play on the night following a battle, in the search for, collection, and dressing of the wounded. Mention is made of Dr. Nikolai's exhaustive studies in this field, and of the acetylene apparatus which he devised. Reh's modification of Nikolai's acetylene lantern should be supplied to every litter bearer, ambulance wagon, dispensary, and dressing station.

The progressive increase in the weight and volume of the material which is considered necessary for the proper equipment of a dressing station calls for the adoption of wagons specially designed for the transportation of this material; except of course, in such commands as are intended to be most mobile—cavalry for example, and in these pack animals must be relied upon. Surgical wagons are already employed in several armies. [Apparently not in Spain. The slowness of Spain to make any extensive use of drugs in tablet form has already been commented upon in a previous article by this author, an abstract of which has been given above. C. N. B.]

The operations of the dressing station is very intimately connected with that of the litter bearers, in spite of the fact that at least a quarter of the wounded are able to walk. When the time consumed in applying first aid to the wounded individual, in carrying him and his equipment to the dressing station, and in returning the empty litter, are all considered, it is calculated that under average conditions a litter squad travels at the rate of two kilometers an hour: and, as the distance from the point at which the soldier falls wounded and the station at which his wound is dressed averages approximately one kilometer, [five eighths of a mile], it is calculated that each litter will transport only one patient an hour.

Benech\* gives algebraic formulae for calculating the number of wounded which will probably have to be provided for, the time which will be consumed in attending and transporting them, etc., but these formulae are not easily retained in the memory.

The medical officer in charge of the dressing station and his assistants rapidly examine the wounded as these arrive, divide them into groups according to the disposition which is to be made of them—whether to be returned to the firing line at once, dressed or operated upon at once, transported to the field hospital, or left at the dressing station on account of not being able to endure transportation—and fill out diagnosis cards for all.

The manner in which the wounded should be evacuated to the field hospital and the nature of such urgent operations as should alone be performed at the dressing station are well indicated in regulations. Attention should be paid especially to hemostasis, the treatment of post-hemorrhagic syncope, and the reduction and immobilization of fractures. At this station vessels should not ordinarily be ligated above the wound, but in the wound. Hypodermic injections of morphia should here be rather freely used for the relief of pain and nervous excitation.

The medical officer should always remember that the principal object of the dressing station is merely to put the wounded into such condition that they may be transported to the field hospital as soon as possible, and should never forget what Sarazin, Inspector in the Sanitary Corps of the French Army, said after the Battle of Fröschweiler†: "Good surgery requires more calm and less distraction than exist on the battle field."

EXPERIMENTS ON CADAVERS AS TESTS OF THE EFFECTS OF FIRE-ARMS. Abudemio Ruiz Lozano ridicules the supposition that by "firing at dead people" we can learn the effects

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\*In his "Service de Santé en Campagne."

†The battle of Wörth or Reichshofen, in Alsace, where the Germans under the Crown Prince of Prussia were victorious over the French under MacMahon, Aug. 6, 1870. The Germans lost 10,000; the French 8,000, with 9,000 taken prisoners. C.N.B.

of fire-arms in the living, and incidentally gives a whack at the various theories advanced to explain the so-called "explosive effect" of bullets.

**MEDICAL TEACHING AND THE SANITARY CORPS.** The editor (Angel de Larra y Cerezo) points out two instances of apparent injustice to the medical officers of the army.

First: That at every new station to which a medical officer is sent, perhaps just after he has paid for license to practice in the vicinity of his previous station, he must pay for a new license, at the same rate as is charged local physicians, before he can practice among the civil population.

Second: That in the scheme of Public Instruction the military hospitals, which are the best equipped hospitals in Spain, are never constituted as nor utilized in connection with medical colleges for the instruction of civilians, and medical officers are not given an opportunity to hold civil professorships. As one example of the relationship which should obtain between the Army Sanitary Corps and Public Medical Instruction is cited the case of the Inspector in the Sanitary Corps of the Army of the Argentine Republic who is Professor of Clinical Medicine in the Faculty of Buenos Aires and is authorized to give his instruction in the military hospital at that city.

**THE GREAT HYGIENIC AND SOCIAL PROBLEMS IN RELATION TO ARMIES.** This is the title of a long article by Angel Fernandez Caro written in answer to the thesis which was presented by Dr. Angel de Larra y Cerezo on his admission to the Royal Academy of Medicine. Only the introduction is published in the volume of "*La Medicina Militar*" for 1902, and the remainder of the article will occupy several succeeding numbers in 1903.

# Medico-Military Index.

## MEDICO-MILITARY HISTORY AND DESCRIPTION.

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- Jenkins (E. L.)** Life in a flying column. *St. Mary's Hosp. Gaz.*, Lond., 1902, viii, 86.
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- Meyer.** [The Kaiserin Augusta Foundation (military hospital) in Potsdam.] *Rothe Kreuz*, Berl., 1902, xx, 464.
- Neumann.** [The development of military medicine in extra-German countries with special reference to volunteer nursing service.] *Rothe Kreuz*, Berl., 1902, xx, 419; 441; 467.
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**Tile (V. A.) & Gagen-Torn (I. E.)** [Surgical activity of the Russian Red Cross division in Athens in the Greco-Turkish war in 1897]. *Voyenno-med. J.*, St. Petersburg., 1902, lxxx, med.-spec. pt., 2593; 2863.

**Wolffhügel.** Der Sanitätsdienst im Berggefecht am Tschang-tschönnling 8 märz 1901 mit einigen Betrachtungen über Sanitätstaktik im Gebirgskriege. *Deutsche mil.-ärztl. Ztschr.*, Berl., 1902, xxxi, 393-411.

**Worthington (A. N.)** No. X Canadian Field Hospital. *Montreal M. J.*, 1902, xxxi, 542-547.

### MEDICO-MILITARY ADMINISTRATION.

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**Army (The)** medical service as a career [Edit.]. *Brit. M. J.*, Lond., 1902, i, 1223.

**New (The)** royal warrant for the army medical service. *Med. Mag.*, Lond., 1902, xi, 273-280.

**Baudet (G.)** [The surgeon dentist in the army.] *Progrès dent.*, Par. 1902, xxix, 378-381.

**Bergmann.** [First aid on the field of battle; asepsis and antisepsis in field.] *Arch. de méd. et pharm. mil.*, Par. 1902, xl, 429; 514.

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**Romeyn (D.)** Le service sanitaire dans les armées et la Croix-Rouge. *Mil.-geneesk. Tijdschr.*, Haarlem, 1902, vi, 177-181.

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## Editorial Department.

### THE STATUS OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES AT ITS TWELFTH ANNUAL MEETING.

**T**HE full report of the proceedings of the twelfth annual meeting, held last month in Boston, will form the bulk of the July number of the JOURNAL, but it may not be out of place to indicate here a few of the principal items of the work. The most important action taken was of course the reorganization of the Association in accordance with the Act of Congress creating it an official corporation under the laws of the United States. The Constitution and By-Laws,—as may be seen upon examination of the revised version presented in this issue of the JOURNAL,—were revised so as to conform to the act of incorporation and to embody such improvements as the experience of twelve years had shown to be necessary and desirable.

The official status of the Association was established by that provision of the act attaching three cabinet officers and the three chiefs of government bureaux officially to the Association in the capacity of an advisory board, a fact which was duly recognized.

The enlargement of the work of the Association and the greater responsibility attaching to its work had so much increased the importance of what had hitherto been known as the Executive Committee, that it was very properly erected into an Executive Council with added powers by which it was enabled to perform the functions of a board of directors of a corporation and to conduct all the work of the Association during the period elapsing between the meetings of the Association.

The more active participation in the work of the Association by the Public Health and Marine Hospital Service received recognition by the creation of a third vice-presidency, so that a representative of each of the four elements comprising the Association may be represented in the presidential and vice-presidential

chairs. It is hoped that in this way the principle of rotation in the presidency of the Association may hereafter be fully established, each of the vice-presidents succeeding to the presidency in turn. Much care was shown by the nominating committee at this meeting in selecting incumbents for these offices who should reflect honor upon the Association when they should arrive at its head.

As foreshadowed in the JOURNAL some months ago, the designs of the badge and button of the Association were made official by detailed description in the Constitution. A coat of arms was also created by which the documents of the Association may hereafter be properly authenticated.

Certain of the special committees, which by prolonged usage had practically become standing committees were definitely established in that class. This applied to the Necrology Committee, the Transportation Committee and to the Committee of Arrangements.

Prize competitions which have been held for a number of years without definite official recognition are now established upon a fixed basis, and boards of award are now constitutional bodies. Although heretofore these competitions have been confined to essays upon subjects announced, the field was left open for competition in other directions if it should be desired at any time. This leaves the field open in future for competition in matters of sanitary apparatus, material, or maneuvers, as well as in theory.

A source of much misunderstanding hitherto has been the statement of the constitution that there was no admission fee but that the first year's dues included that fee. The expression "first year" signified the first calendar year of membership extending from the first of January to the last of December, but so many new members construed it to mean twelve months from the date of election to membership, that the By-Laws have now been changed to provide for an admission fee to accompany the application for membership, and remitting the dues for the remainder of the year in which the application is made. There has thus been no change in the amount paid but the statement regarding it has been made more definite.

# Constitution and By-Laws.

Adopted May 19, 1903.

## PREAMBLE.

*The Medical Officers of the Army, of the Navy, of the Public Health and Marine Hospital Service of the United States, and of the Militia of the different States, under the provisions of an act of Congress approved January 30, 1903, have associated themselves together under the name of "The Association of Military Surgeons of the United States." Now, therefore, pursuant to the laws of the United States, the members of said Association do hereby ordain and enact the following:*

## CONSTITUTION.

### ARTICLE I.

#### NAME.

The Association shall be known as "THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES."

### ARTICLE II.

#### OBJECT.

The object of the Association shall be to increase the efficiency of the medical services of the Army, the Navy, the Public Health & Marine Hospital Service, and of the Militia of the different States by mutual association and the consideration of matters pertaining to the medico-military service of the United States both in peace and in war.

### ARTICLE III.

#### MEMBERS.

##### CLASSIFICATION OF MEMBERSHIP.

SECTION 1. There shall be Active, Life, Associate, Ex-Officio, Corresponding and Honorary Members.

##### MEMBERS ELIGIBLE TO OFFICE AND ENTITLED TO VOTE.

SECTION 2. Active and Life members only are eligible to office or entitled to vote.

##### ACTIVE MEMBERS.

SECTION 3. Active membership is limited to commissioned medical officers of—



1. The United States Army;
2. The United States Navy;
3. The United States Public Health & Marine Hospital Service;
4. The United States Volunteers;
5. The National Guard and other state troops; and
6. Contract or acting assistant surgeons of the United States Army, Navy and Public Health & Marine Hospital Service.

Active members may retain their membership, should they be honorably discharged from the service in which they have been commissioned.

LIFE MEMBERS.

SECTION 4. Life membership and exemption from the payment of annual dues is conferred upon—

1. Members who obtain first honorable mention in the prize competitions of the Association.
2. Any active member upon the payment of fifty dollars at one time.

ASSOCIATE MEMBERS.

SECTION 5. Associate membership is open to—

1. Ex-medical officers and
2. Other officers of the aforementioned services,
3. Ex-medical officers of the Confederate Army and Navy, and
4. Medical officers of foreign services.

EX-OFFICIO MEMBERS.

SECTION 6. The Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, the Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health & Marine Hospital Service, in conformity with the Act under which this Constitution is adopted, shall be ex-officio members of the Association.

CORRESPONDING MEMBERS.

SECTION 7. Corresponding membership is open to military surgeons, not resident in the United States, but prominent in military medicine, surgery, and hygiene.

HONORARY MEMBERS.

SECTION 8. The President of the United States, the senior General officer of the Army, and the senior flag officer of the Navy for the time being, shall be honorary members. Other persons who have rendered distinguished services to the Association, or who have otherwise attained distinction deserving of recognition by the Association, are eligible to honorary membership.

ARTICLE IV.

GOVERNMENT OF THE ASSOCIATION.

ADVISORY BOARD.

SECTION 1. There shall be an Advisory Board consisting of the Secre-

tary of the Treasury, the Secretary of War, the Secretary of the Navy, the Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health & Marine Hospital Service and the President of the Association.

#### OFFICERS.

SECTION 2. The officers shall be a President, three Vice-Presidents, a Secretary and a Treasurer, who shall hold their respective offices until their successors are elected and qualified.

#### EXECUTIVE COUNCIL.

SECTION 3. There shall be an Executive Council, to consist of the officers, the ex-presidents and six (6) members, who shall be appointed by the President each year

#### STANDING COMMITTEES.

SECTION 4. There shall be the following Standing Committees, to be appointed annually by the President, except as hereinafter specified:

A Literary Committee, to consist of seven (7) members,—four (4) members from the National Guard, State Troops or Militia, and one (1) each from the Army, Navy and the Public Health & Marine Hospital Service.

A Publication Committee, to consist of three (3) members, one of whom shall be the Secretary as *ex-officio* Chairman.

A Necrology Committee to consist of three (3) members.

A Transportation Committee to consist of one (1) or more members.

A Committee of Arrangements for the next ensuing meeting, to consist of one member, who shall be the chairman, with power to associate with himself such other persons, members of the Association or not, as he may see fit.

A Nominating Committee, based upon a representative or one vote for each State, Territory, the Army, the Navy and the Public Health & Marine Hospital Service, and for every additional ten (10) members or major fraction thereof an extra representative or vote; said vote or votes to be cast by a member or members, present from each State, Territory, Army, Navy and Public Health & Marine Hospital Service, to be designated by the members present from each State, Territory, Army, Navy and Public Health & Marine Hospital Service at the time of meeting.

#### BOARDS OF AWARD.

SECTION 5. Boards of Award shall be appointed by the President for the consideration of such prize competitions, as may from time to time be instituted by the Association. Membership in the Association shall not be required of members of the Boards of Award, which shall be selected in each instance from men conspicuous for knowledge of the subject of the competition.

ARTICLE V.

SEAL, INSIGNIA AND ARMS.

SEAL.

SECTION 1. The seal of the Association shall consist of a circle, two and three-eighths ( $2\frac{3}{8}$ ) of an inch in diameter, charged with the cross of the insignia with the words "Organized 1891, Incorporated by Congress, 1903" within a circumferential band bearing the words "Association Military Surgeons United States."

INSIGNIA.

SECTION 2. The insignia of the Association shall comprise (1) a Cross; (2) a Button.

(1). The Cross shall be of gold, the obverse, enameled with red and bordered with gold, upon which shall be superimposed, a white shield, enclosing a shield of the United States in its proper colors,—red, white and blue, with stars of gold, surrounded by the motto "*Omnia pro Patriae Caritate*"; the reverse, plain gold and bearing its number. Upon the reverse the cross suspended by a ribbon, consisting of two bands of crimson enclosing a band of white, may be worn by any member of the Association on ceremonial occasions, and shall be carried on the left breast,—or at the collar, if the wearer be an officer of the Association.



The Insignia.

(2) The Button shall consist of a red enameled cross, outlined in gold, upon a field of white enamel surrounded by a blue band, three-fourths ( $\frac{3}{4}$ ) of an inch in diameter outlined on either side by circles of gold, and bearing the legend also in gold, "*Omnia pro Patriae Caritate*." It may be worn by all members at their discretion in the upper left-hand button-hole of the civilian coat.



The Seal.



The Button,  
GILT LINES OMITTED.

## COAT OF ARMS.



The Coat of Arms.

SECTION 3. The Coat of Arms shall consist of a shield, bearing in the center the cross of the insignia of the Association and, quartered about it, the caduceus, the acorn, the crossed anchor and caduceus and a crossed saber and rifle, surmounted by a red-cross guidon,—emblematic of the Medical Departments of the Army, the Navy, the Public Health & Marine Hospital Service and the State forces, — with a crest consisting of an eagle with outspread wings, bearing a Geneva Cross upon his breast,—emblematic of the patriotic and altruistic character of the Association.

## ARTICLE VI.

## QUORUM.

Thirty-five (35) members shall constitute a quorum for the transaction of business, but a less number may adjourn.

## ARTICLE VII.

## AMENDMENTS.

All amendments to this Constitution and By-Laws shall be proposed in writing at one annual meeting, and voted on at the next. A three-fourths vote of all the members present at the annual meeting shall be necessary for adoption.

## BY-LAWS.

## ARTICLE I.

## ELECTION TO MEMBERSHIP.

## ACTIVE OR ASSOCIATE MEMBERSHIP.

SECTION 1. Election to active or associate membership shall be by the Executive Council, to whom the Secretary shall refer all applications, together with such credentials as may be presented.

## CORRESPONDING OR HONORARY MEMBERSHIP.

SECTION 2. Election to corresponding or honorary membership shall be by a two-thirds vote of the Association, after the unanimous recommendation of the Executive Council.

## ARTICLE II.

## EXPULSION FROM MEMBERSHIP.

Any member who may be dismissed from the service for conduct unbe-

coming an officer and a gentleman shall be expelled and debarred from any further rights or privileges when proper proof has been furnished the Secretary.

*ARTICLE III.*

MEETINGS.

The Association shall meet annually, the time and place to be fixed at each meeting for the one ensuing. Special meetings may be called by the President at any time. At the annual meeting the President, Vice-Presidents, and the Treasurer shall be elected for the term of one year, the standing committees appointed, and the annual reports received.

*ARTICLE IV.*

DUES AND DELINQUENTS.

ADMISSION FEE.

SECTION 1. The admission fee to be paid by Active and Associate members shall be three dollars, (\$3.00), which shall accompany the application for membership.

ANNUAL DUES.

SECTION 2. The annual dues shall be three dollars, (\$3.00), due on the first of January of each year. No annual dues shall be required of new members for the remaining portion of the calendar year in which their admission fees have been paid.

DELINQUENTS.

SECTION 3. Delinquents in the payment of dues will not be entitled to the Journal or other publications of the Association. Delinquency for two years shall terminate membership, after due notice by the Treasurer.

MEMBERS EXEMPT FROM DUES.

SECTION 4. Honorary, Corresponding, Ex-Officio, and Life members shall be exempt from the payment of dues.

*ARTICLE V.*

DUTIES OF THE ADVISORY BOARD.

The Advisory Board shall meet at such times as the interests of the public service may demand. Meetings may be called by one or more members of the Board and three members shall constitute a quorum. Any action taken by the Board shall be reported to the Association through the President of the Association.

*ARTICLE VI.*

DUTIES OF OFFICERS.

THE PRESIDENT.

SECTION 1. The President shall preside at all meetings, appoint all committees, unless otherwise provided for, approve all proper bills, and perform such other duties as are usually incumbent upon such an officer.

THE VICE-PRESIDENTS.

SECTION 2. The Vice-Presidents in order of seniority, shall perform the duties of President in the absence or inability of that officer.

## THE SECRETARY.

SECTION 3. The Secretary shall keep the records and archives of the Association; receive all applications for membership and refer them to the Executive Council; notify the Treasurer of the election of active and associate members; issue certificates of membership to active, associate, corresponding and honorary members on election, and to life members when advised by the Treasurer that the necessary fee has been paid; and shall hold office until his tenure is terminated by resignation or death, or by the election of his successor after due and timely notice.

He shall be a member and *ex-officio* chairman of the Publication Committee.

He shall appoint an Assistant Secretary each year, and shall present an annual report.

## THE TREASURER.

SECTION 4. The Treasurer shall receive all moneys due the Association, collect all assessments, and pay all bills which have been properly approved.

The accounts of the Treasurer shall be audited by a committee appointed for that purpose on or before the annual meeting. He shall present an annual report.

He shall execute such bond of \$2,000 as may be approved by the Executive Council for the faithful performance of his duties, the Association to bear the cost of this insurance.

## ARTICLE VII.

## THE EXECUTIVE COUNCIL.

## DUTIES.

SECTION 1. The Executive Council shall be charged with the conduct of the affairs of the Association during the intervals between the annual meetings, shall elect active and associate members, and perform such other duties as may be assigned to it by the Constitution and By-Laws or by vote of the Association at any stated or special meeting.

## CONDUCT OF BUSINESS.

SECTION 2. The business of the Executive Council may be conducted by correspondence or at such meetings as may be called by the chairman upon his own initiative or at the request of any three members.

## OFFICERS.

SECTION 3. The president, the secretary and the treasurer of the Association respectively shall be *ex-officio* chairman, secretary, and treasurer of the Executive Council.

## QUORUM.

SECTION 3. Five members of the Executive Council shall constitute a quorum for the transaction of business.

*ARTICLE VIII.*

DUTIES OF STANDING COMMITTEES.

THE LITERARY COMMITTEE.

SECTION 1. The Literary Committee shall outline the literary work for the annual meeting in advance, making the necessary arrangements for the reading and discussion of papers.

The Chairman shall be responsible for the program for the ensuing meeting.

The Committee shall assist the Publication Committee in the prompt publication of the Proceedings.

THE PUBLICATION COMMITTEE.

SECTION 2. The Publication Committee shall have charge of the publications of the Association.

It shall determine what portions of the proceedings are of sufficient general interest to be printed, and decide upon the advisability of publishing the several papers, presented at the annual meetings, and such other matter as may be of value to the Association.

It shall prepare for publication, contract for printing, and see through the press all the publications of the Association; but all contracts for printing must first have the approval of the President and the Treasurer.

THE NECROLOGY COMMITTEE.

SECTION 3. The Necrology Committee shall report to the Association at each annual meeting, the deaths that have occurred during the preceding year among the members of the Association, with a suitable memoir in each case.

THE TRANSPORTATION COMMITTEE.

SECTION 4. The Transportation Committee shall have charge of the arrangements for the transportation of members to and from the meetings of the Association.

THE COMMITTEE OF ARRANGEMENTS.

SECTION 5. The Committee of Arrangements shall have charge of all local arrangements for the annual meetings of the Association.

THE NOMINATING COMMITTEE.

SECTION 6. The Nominating Committee shall, at the annual meeting present a list of candidates for the various offices for the ensuing year.

The vote or votes, of the Nominating Committee shall be cast by a member or members present from each State or Territory, the Army, the Navy, and the Public Health & Marine Hospital Service.

*ARTICLE IX.*

DUTIES OF BOARDS OF AWARD.

Boards of Award shall be charged with the selection of the person or persons to whom prizes shall be awarded, in accordance with the regulations of such prize competitions as may, from time to time, be instituted, and shall report the results thereof at such time as may be designated by the Association.





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